Consumers’ Food Choice at a Restaurant
Depending on Nutritional Information and Nutritional Menu Context

Dissertation

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Abstract

Americans are gaining weight. As such, the issue of obesity has received the increased attention. One of the most recent concerns is how the food industry is contributing to the problem of obesity and related health problems; increased consumption of food away from home, food which often contains high levels of calories and fats, may be worsening the problem of obesity. Thus, while restaurants make an effort to develop and introduce healthy food, the government has also addressed the problem by introducing The Menu Education and Labeling Act (MELA), which requires restaurants to present nutritional information on the menu. Such legislation has been proposed or passed in several cities and states. Accordingly, the importance of and the interest in nutritional information disclosure has increased. A thorough examination of the effects of nutritional information disclosure is required in order to achieve the benefits of nutritional information disclosure for restaurateurs, consumers, and policy makers.

The purpose of this study was to provide a better understanding of how consumers process nutritional information in a restaurant and which factors influence consumers’ nutritional information processes and food choices. More specifically, this study sought to determine the effect of providing nutritional information on a menu, as well as the moderating effects of several factors such as nutritional menu context, motivation to process nutritional information, and nutritional knowledge.

In order to achieve this purpose, an experimental design method was employed to
collect data. An experimental design was developed using three key variables: nutritional information level, nutritional level of target items, and nutritional level of menu context. Using the results of two pilot studies, favorable menu items available in restaurants and six important nutrient contents were selected; levels of nutritional values for the six nutrient contents were selected for each menu item.

Multiple regression analysis was conducted to test the proposed hypotheses, and significant results were found. First, the presence of nutritional information had a negative effect on consumer food evaluation and decisions, regardless of the healthiness of the item at hand. Additionally, the healthiness of other alternatives on the menu significantly influenced consumer food decision processes as well as the effect of nutritional information disclosure. Thus, it was concluded that the placement of menu items on the menu is very important in promoting healthy item choices. It is important to educate and encourage consumers to process nutritional information accurately because motivation to process enhances the effects of nutritional information disclosure.

The results of this study provide useful information not only for restaurateurs, who may be able to develop more efficient marketing strategies using nutritional information, but also for consumers, who will be able to make better choices when eating foods away from home.

Key terms: nutritional information, menu context, motivation, nutritional knowledge
Dedication

Dedicated to all my family:
With their love and support, I was able to reach this point in my life.
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CHAPTER 1: INTRODUCTION

1.1 Background

Americans are gaining weight. The rate of obesity in the U.S. has unexpectedly increased over the past 30 years. According to The National Health and Nutrition Examination Survey (NHANES), almost half of American adults were overweight or obese in the 1970s; by 2004, this proportion had increased to more than two thirds of American adults. The growing rate of obesity has received significant attention in recent years since it is one of the critical causes of several public health problems, including cardiovascular disease, hypertension, stroke, and diabetes mellitus (Centers for Disease and Control Prevention (CDC), 2007b). Consequently, the increasing rate of obesity has led to an increase in medical expenditures. In 1997, the direct costs associated with being overweight and obese amount to approximately 5.7% of total U.S. medical expenditures; this figure continues to rise steeply (Wolf & Colditz, 1998). In 2002, the estimated medical costs associated with obesity reached 92.6 billion dollars, which accounted for 9.1% of total U.S. medical expenditures (CDC, 2007a). Obesity has therefore become one of the fastest growing health issues; accordingly, research has been undertaken to explain the causes of the obesity epidemic and to prevent the increasing rate of obesity.

From the perspective of economics, a variety of topics related to obesity have been considered: the role that technological change plays in explaining trends in obesity,
how maternal employment affects obesity rates, the impact obesity has on wages and health insurance premiums, and behavioral economic explanations of obesity. For instance, the time and effort that women need to prepare food was reduced by a technological revolution bringing about improvements, such as equipment for food preparation, food packaging, delivery systems, as well as widespread microwave use (Cutler, Glaeser, & Shapiro, 2003). By economizing time and effort, women spend fewer calories on their work at home, thus creating an imbalance between calorie intake and expenditure. This is considered to be one of the causes of obesity. In another study, Chou, et al. (2004) identified several significant predictors of body mass index and the probability of being obese: household income, the price of food at home, the price of quick-service and full-service restaurants, the price of alcohol, as well as the price of cigarettes.

Researchers in the area of social behavior have proposed lifestyle change as another explanation for the obesity problem. Due to new technology, physical activities undertaken both at the workplace and out-of-work have decreased (Philipson & Posner, 2003). People are also more likely to spend their time participating in watching television or playing games rather than performing housework or other physical activities (Cutler, et al., 2003). This sedentary lifestyle may contribute to obesity by disrupting the balance between energy intake and expenditure. Many studies have provided evidence for this lifestyle based explanation of obesity (Hill, Wyatt, Reed, & Peters, 2003; Hu, Li, Colditz, Willett, & Manson, 2003).

More recently, researchers have become concerned that the food industry itself is an important contributor to the problem of obesity and its related health problems, since
expenditures on food away from home are increasing. This includes all food purchased and consumed away from home such as at restaurants, schools, or hospitals. According to the U.S. Department of Agriculture (USDA, 2008), in 2007 money spent on food away from home represented 49% of total household food expenditures, a figure which had increased from 33% in 1970. It has been projected that expenditures on food away from home will reach about 51% of total food expenditures by 2016; thus exceeding the expenditure on food consumed at home. Additionally, Americans who are over 7 years of age dined at restaurants on average 218 times per year; people with household incomes over $75,000 ate at a restaurants more often (4.9 times per week) than did people with incomes below $15,000 (3.2 times per week) (Ebbin, 2000). A number of studies have indicated that this increase in food consumption away from home has a significant impact on obesity rates (Binkley, Eales, & Jekanowski, 2000; Bowman & Vinyard, 2004; Chou, et al., 2004; French, Story, Neumark-Sztainer, Fulkerson, & Hannan, 2001). This phenomenon may be explained by the fact that many foods offered by full-service and quick service restaurants – two main segments of the food away from home market – are energy dense foods, high in both calories and fat (Glanz, Sallis, Saelens, & Frank, 2005; Hill & Peters, 1998). For example, a king size Burger King Double Whopper with cheese contains approximately 2,180 calories, more calories than the total recommended daily allowance (2,000 calories). Furthermore, it has been shown that children, on average, consumed more calories (770 calories) at a restaurant than they did when they ate at home (420 calories) (Zoumas-Morse, Rock, Sobo, & Neuhouser, 2001). Accordingly, more frequent food consumption at restaurants should tend to increase the rate of obesity.
As one of the suspected parties responsible for obesity, food companies have been blamed and threatened with fines, restrictions, and legislation (Wansink & Chandon, 2006). Above all, quick service restaurants such as McDonalds and Burger King have been blamed for the increase in obesity rates. As a result, they have received bad press and have been sued by their customers. Food companies and legislators have come together in order to overcome this problem: not only are food companies making an effort to develop and provide more healthy options, but the U.S. government has also encouraged consumers to purchase healthy food and has proposed the law referred to as The and Nutrition Labeling Education Act (NLEA) for packaged foods and The Menu Education and Labeling Act (MELA) for restaurants.

The NLEA was proposed and implemented by the U.S. Food and Drug Administration (FDA). According to the NLEA, the labels of packaged food products must list the nutritional information with daily reference values for the following nutrients: total calories, total fat, saturated fat, trans fat, cholesterol, sodium, sugars, carbohydrates, dietary fiber, protein, vitamin A, vitamin C, calcium and iron (FDA, 1994). The purpose of this law is not only to increase consumers’ use of nutritional information, but also to help consumers in choosing healthier foods based on the information provided to them (Burton & Andrews, 1996). Byrd-Bredbenner (2000) found that 29% of consumers always read and used nutritional labels, while 66% of consumers sometimes read and used nutritional labels when purchasing food for home consumption. In addition, in response to the NLEA, food product manufacturers evaluated and modified existing packaged food and introduced nutritionally improved new products (Center for Science in the Public Interest (CSPI), 2008).
However, the NLEA applies only to packaged foods because it is easy to evaluate nutritional values of standardized products. The legislation excludes food consumed at the point of purchase, such as in restaurants or cafeterias, on airplanes, and from vending machines (Kozup, Creyer, & Burton, 2003). Although some chain restaurants provide nutritional information of menu items through brochures or on corporate websites, displaying nutritional information is not required on menus in restaurants. It is difficult to present nutritional information of all menu items due to limited space on menus, lack of standardized foods, and various costs (Almanza, Nelson, & Chai, 1997). As the expenditure for food away from home and the calorie intake from eating out have continuously increased, the lack of nutritional information for foods sold or served in restaurants has become increasingly controversial.

A separate law requiring nutritional information on restaurant menus has been proposed in several states and is under review by Congress; this law is referred to as the Menu Education and Labeling Act (MELA). The MELA law would require chain and quick service restaurants to provide nutritional information such as the total amount of calories, saturated fat, trans fat, carbohydrates, and sodium contained in menu items (Cranage, Conklin, & Lambert, 2004). Recently, New York City enacted legislation which requires restaurant chains with 15 or more establishments to list total calories of items on the menu, while California enacted the California Menu Labeling Bill, requiring that nutritional information be displayed for fast-food and chain restaurants with 20 or more outlets. Philadelphia City Council also passed a menu labeling law which requires restaurants with at least 15 outlets nationwide to provide nutritional information for four nutrients in addition to total calories count (Nation’s Restaurant News (NRA), 2008).
Additionally, San Francisco and King County in Washington have enacted menu labeling laws, and more than 20 states, cities and counties, including Montgomery County in Maryland, Nassau and Westchester Counties in New York, and Multnomah County in Oregon, were preparing menu labeling proposals in 2008 (CSPI, 2008).

As a result, restaurants are reducing calorie content in their recipes and portion sizes. For instance, Starbucks is saving the calories by swapping whole milk for 2%, and McDonalds reduced the calorie count of their french fries from 570 to 500 (Kim, 2008, October 29). Many other restaurants such as Quiznos and Dunkin Donuts have introduced smaller sized meals or less caloric food. In addition, consumers are given access to nutritional information and can therefore choose healthier foods (Cranage, et al., 2004). According to the report released by Center for Science in the Public Interest (Wootan, 2003), almost 75% of consumers used the nutrition fact label while purchasing packaged food, and about half of consumers picked healthier over unhealthier food based on the nutritional information provided. Thus, the menu labeling law has inspired policy changes nationwide, and restaurants and food companies have noticed the influence that nutritional information disclosure on the menu can have on consumers.

With this increased interest in nutritional information, it is becoming necessary to explore the impact that nutritional information has on consumer food purchase behavior in restaurants. Several studies found that healthiness of food is one of the important components consumers consider when making food choices, and that consumers are more likely to purchase healthy foods with fewer calories or less fat when the nutritional information is provided on the menu (Burton & Creyer, 2004; Edwards & Meiselman, 2005; Kozup, et al., 2003; Stubenitsky, Aaron, Catt, & Mela, 2007). However, it remains
unknown which factors encourage consumers to process the nutritional information, and how nutritional information can best promote healthy food choices. Therefore, it is essential to study the impact that nutritional information presented on the menu has on food choices, and to identify the factors that influence how nutritional information is used in food evaluation.

This study thus focused on the effect that nutritional information disclosure has on consumers’ food evaluation, as well as the effects of other influential variables on nutritional information processing and food purchase behavior in the restaurant context. The results of this study will be useful not only for restaurateurs, who may be able to develop more efficient marketing strategies using nutritional information, but also for consumers, who will be able to make better choices when eating foods away from home.

1.2 Statement of the Problem

As the concern for health increases, so has the demand for healthy food. In order to satisfy consumers’ wishes, a variety of healthy menu items have been introduced in restaurants and the Menu Education and Labeling Act (MELA) for restaurants has been proposed. A recent Harvard Poll found that 62% of Americans support this regulation (Finkelstein, French, Variyam, & Haines, 2004).

However, many studies addressing nutritional information have not been conducted in a restaurant setting. According to Dorms (2006), consumers use different information in making decisions at restaurants than they use when deciding about what food to consume at home. The information used differs because these two decisions occur in different situational contexts; private or public places. In public places,
consumers contemplate their self-image or self-regulation if they are accompanied by others, excluding family and friends, because it is important that consumers favorably impress others by their choices. There was evidence that consumers tend to select healthier menu items when dining with colleagues or business partners (Hochradel, 2007). Thus, the first purpose of this study was to examine the extent to which the nutritional information presented on menus influences consumer food evaluation and choice at a restaurant.

Prior research has demonstrated that consumers are more likely to have a positive food attitude and increased consumer purchase intention when provided with healthier nutritional information on a menu. In contrast, food attitude and purchase intention decrease when unfavorable nutritional information is provided (Burton & Creyer, 2004; Cranage, et al., 2004; Kozup, et al., 2003). Additionally, consumers tend to underestimate the number of calories or the amount of fat contained in food offered by restaurants (Chandon & Wansink, 2007b). There is evidence that consumers’ expectations of the number of calories, amount of saturated fats, and sodium levels are significantly different from the actual levels contained in restaurant food; this difference may be even greater for less healthy foods than for healthier foods. However, when nutritional information is presented on the menu, consumers tend to make healthier menu item choices (Burton, Creyer, Kees, & Huggins, 2006). Thus, it is suggested that providing nutritional information positively affects healthy eating behavior.

In contrast, other studies showed that providing nutritional information on menus has no effect on the use of information, the evaluation of food, or consumer food choices in a restaurant setting (Droms, 2006; Stubenitsky, et al., 2007). The lack of effect was
explained by suggesting that people consider eating out a special event where they are allowed to eat any food, regardless of health (Stubenitsky, et al., 2007). Dorms (2006) also suggested that, when making food choices, people consider other important and influential components besides health benefits, such as the taste of the food or their food preferences. Moreover, awareness and use of presented nutritional information may be influenced by consumers’ individual characteristics, such as motivation to perform healthy behavior, health consciousness, nutritional knowledge, and health status (Moorman, 1990). Among these characteristics, the impacts of nutritional knowledge and motivation to perform healthy behavior, especially motivation to process nutritional information, have been explored in prior studies targeting packaged food products (Burton, Garretson, & Velliquette, 1999; Keller, et al., 1997; Moorman & Matulich, 1993). The finding common to the studies was that consumers are more likely to have a favorable attitude toward healthy food and purchase healthy food when they have high nutritional knowledge and high motivation to process nutritional information. However, despite the significant role nutritional knowledge and motivation play in food decisions, subsequent studies have not investigated how these traits may affect consumer food choices in restaurants. Accordingly, it should be determined how nutritional knowledge and motivation to process nutritional information affect evaluations of menu items at restaurants, depending on the presence of nutritional information.

Another influential factor in processing nutritional information is menu context. Menu context is determined by the set of all available food items on a menu. Consumer food choice may be affected by the menu context since consumer food preferences and choices are dependent on all available options at the point of purchase. In evaluating a
specific menu item, consumers compare it with alternatives using information such as the
description or price of the menu items (Dhar & Simonson, 1992). For example, if new price information is encountered or one of the prices in a product set is changed, consumers usually compare the new price with the prices of all available products (Lynch, Chakravarti, & Mitra, 1991). This is called the context effect; alternatives influence consumer choice. Evidence of the context effect has been found in several previous studies (Huber, Payne, & Puto, 1982; Huber & Puto, 1983; Simonson, 1989; Simonson & Tversky, 1992). Similarly, the nutritional information associated with each available alternative on the menu should relatively influence consumer food evaluation and choice within the menu context. Nonetheless, the influence that menu context has in terms of nutritional information processing has been examined in only a few studies (Burton & Creyer, 2004; Kozup, et al., 2003); prior studies were further limited to include only unhealthy target items or unhealthy contexts. Although the results from previous studies showed a significant context effect on food attitude and purchase intention, these finding must be further generalized: it is necessary to understand how consumers compare and evaluate nutritional information of available options on the menu and also to determine whether the context effect exists for both healthy and unhealthy items.

1.3 Purpose of the Research

The aim of this study was to investigate how the presence of nutritional information on a menu affects consumers’ food evaluation and food purchase behavior in a restaurant. Specifically, the objectives of this study were as follows:

(1) To investigate whether the presence of nutritional information on the menu
will influence consumer food decision making in a restaurant context.

(2) To identify the influence of menu context in which a specific menu item is evaluated when nutritional information is provided.

(3) To determine how the impact of nutritional information may be moderated by consumers’ motivation to process nutritional information and nutritional knowledge.

1.4 Significance of the Research

The problem addressed by this study is extremely important for a number of reasons. First, the study adds to the limited amount of literature which considers the influence of nutritional information presented on menus. In particular, only a few research papers have investigated the effect of nutritional information disclosure in a restaurant and have mainly focused on the effects of nutritional menu context depending on the presence of nutritional information. Thus, the results of this study extend the literature; they also provide support for menu labeling laws and help to create effective strategies for the restaurant industry.

Second, the results of this study provide important insight into the way consumers understand and apply nutritional information when purchasing food in a restaurant. Restaurants could benefit by becoming aware of the potential effects nutritional information have on consumer choices, and to promote the benefits. In addition, motivation to process nutritional information is important factor in moderating the effect of nutritional information, and nutritional knowledge directly affect consumer food choices. Thus, it is critical to educate consumers about nutrition and the importance of
This study also identified which menu items consumers choose among several alternatives depending on the presented nutritional information. Thus, it helps restaurateurs to undertake better marketing strategies which emphasize healthy foods using nutrition labels and to develop menu items which balance between healthy and unhealthy foods.

This study is ultimately expected to provide information on how to better educate consumers such that they increase the use of nutritional information on menus and control their food consumptions for health. It also aids restaurateurs in understanding how consumers use nutritional information in the menu decision process, and allows restaurant owners to use better marketing strategies to promote healthy foods.

1.5 Organization of the Dissertation

This dissertation is organized in five chapters: Chapter 1, the current chapter, states the problem and the purpose addressed by the study. It outlines the significance of the dissertation and discusses the potential contributions to both academic and practical fields. Chapter 2 reviews the relevant literature to provide an understanding of the impacts nutritional information and other factors have on decision making in a restaurant setting. This chapter also includes the proposed hypotheses and conceptual model based on previous literature. Chapter 3 addresses the methodology in developing the experimental design and explains the statistical methods used. Chapter 4 presents the results of data analysis and hypothesis testing. Chapter 5 discusses the findings of the research and its limitations, and concludes the dissertation with theoretical and
managerial implications.

1.6 Definition of Terms

Nutritional Information

Nutritional information is defined as information concerning the nutrition content of various foods as compared to the nutritional requirements necessary to support life. Nutritional information includes the amount, in grams, of serving size, and the nutrients included in that serving, like total calories, calories from fat, total fat, saturated fat, trans fat, cholesterol, sodium, total carbohydrates, dietary fiber, sugar, protein, vitamin A, vitamin C, calcium, and iron (Wikipedia, 2009).

Healthy Food

According to the criteria published by the Food and Drug Administration (FDA), “healthy food” refers to “a food that is low in fat and saturated fat and that contains limited amounts of cholesterol and sodium”. The recommended daily values of the above four nutrients, based on a diet of 2,000 calories a day, are the following: less than 65g of total fat, less than 20g of saturated fat, less than 300mg of cholesterol, and less than 2400mg of sodium. Furthermore, “if it is a single-item food, it must provide at least 10 percent of one or more of vitamins A or C, iron, calcium, protein or fiber. If it is a full course meal including entrée and dessert, it must provide at least 10 percent of two or three of vitamins A or C, iron, calcium, protein or fiber, and the content of sodium can not exceed 480mg per serving” (FDA, 1999).
Motivation to Process Nutritional Information

According to Moorman and Matulich (1993, p.210), health motivation is defined as “consumers’ goal-directed arousal to engage in preventive health behaviors”. That is, health motivation refers to consumers’ willingness to perform, or interest in performing healthy behaviors including nutrition label information acquisition from media, family, or friends, life-balancing behaviors, positive diet addition, negative diet restriction, alcohol moderation, and tobacco nonuse. However, this study focused on the motivation to process given nutritional information with the goal of healthy eating behavior in a restaurant setting.

Nutritional Knowledge

Nutritional knowledge refers to “the extent to which consumers have enduring health related cognitive structures”. Namely, it is an ability to use the nutrition and health information accurately (Moorman & Matulich, 1993, p.210).

Nutritional Menu Context

Bettman, et al. (1991) used the term “context” to refer to a choice set that includes other characteristics of the choice environment, and Simon and Tversky (1992, p.281) defined “context” as “the set of alternatives under consideration”. Based on these definitions, menu context can be defined as a group of all available menu items that a consumer evaluates when choosing items off the menu.

With respect to nutritional information, Kozup, et al. (2003, p.20) used the term “nutritional context”; that is “the nutritional frame created by other menu items”. On the
other hand, Burton and Creyer (2004, p.122) employed the term “nutritional frame”, which is “the context within which the menu item is presented”. Thus, in this study, the term “nutritional menu context” was used to refer to a menu context containing the nutritional information associated with each menu item.
CHAPTER 2: LITERATURE REVIEW

In order to achieve the research objectives proposed in Chapter 1, prior studies relating to restaurant menu labeling and healthy eating behavior have been reviewed. The literature review provides the theoretical foundation for this study and the rationale for the conceptual model and hypotheses. Specifically, this chapter reviews necessary theories of how nutritional information in restaurants shapes consumer food choice and outlines other significant factors that influence food choices.

2.1 Theoretical Framework

There are many theories which seek to explain consumer behavior in the marketplace. Among them, two fundamental theories were drawn upon to defend the structure and ideas of the present study: The Elaboration Likelihood Model (ELM) and Context Effect. These models provide a method of examining the basic procedures consumers use in information processing, and help identify the key influential factors involved in information processing. As such, these models guided the conceptual model of this study.

2.1.1 The Elaboration Likelihood Model (ELM)

The Elaboration Likelihood Model (ELM), introduced by Petty and Cacioppo (1981), was used in this study to account for the process that consumers use when they

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become aware of nutritional information and use it in making food choices. The ELM is generally employed to model how information or messages in persuasive communication influence judgment or attitude change in both social and consumer psychology. The ELM clarifies the process of how consumers build or change their attitudes through two different routes: the central route and the peripheral route (Petty & Wegener, 1999). Through the central route, consumers’ attitudes may be stronger or changed by careful consideration of information, whereas attitude changes through the peripheral route are based not on diligent consideration of information but rather on a simple inference from the related cues in the persuasion context (Petty, Cacioppo, & Schumann, 1983).

Therefore, consumers generally make more effort to elaborate information or messages through the central route than they do through the peripheral route.

In particular, motivation and ability to process information plays an important role in accessing and elaborating information through the central route (Petty & Wegener, 1999). Motivation to process information or messages usually depends on individual or situational factors such as the need for cognition, involvement, or personal relevance (Bagozzi, Gurhan-Canli, & Priester, 2002). If the provided information increases a consumers’ perceived involvement, they will be more likely to elaborate given information (Petty & Cacioppo, 1984). For example, if nutritional information is provided to consumers who are very health conscious, they should be more motivated to use it in making food choices (Chandon & Wansink, 2007b). In addition to motivation, the ability to process information in light of distraction, repetition, or knowledge is another important factor in the information elaboration process. For instance, if consumers are distracted, they will be less able to make a cognitive effort; on the other
hand, consumers who are knowledgeable in a subject should be more willing to spend time and effort thinking about it (Petty & Brock, 1981). When consumers have enough motivation and ability to process the relevant information or message content, they are more likely to elaborate all relevant information carefully.

Furthermore, arguments or cues play an important role in the information elaboration process. The information available in the persuasion situation can be evaluated on a variety of criteria, such as quality, source, message, and context information (Petty & Wegener, 1999). According to the ELM, when consumers have sufficient motivation and ability to process, they may focus on information itself and evaluate the information using any one of these criteria. In particular, the quality of argument, including such traits as the number of arguments and the source’s level of expertise, is more important for consumer. On the other hand, consumers under the peripheral route who lack motivation or ability to process the presented information use only small amounts of information or source attractiveness as criteria for information evaluation.

Consequently, consumers who process information or messages through the central route are expected to engage in cognitive effort; the thoughts and attitudes obtained through this process should be more reasonable, relatively persistent, and resistant to opposite persuasion (Haugtvedt & Petty, 1992; Petty, Haugtvedt, & Smith, 1995). Additionally, attitudes created or changed by the elaborated process are more likely to represent consumers’ behavioral intention and behavior than are attitudes which result from less cognitive processes (Bagozzi, et al., 2002).
2.1.2 Context Effect

The ELM says that motivation and ability to process information, along with quality of information provided, directly influence consumers’ information processes; the resulting thoughts or attitudes may be favorable or unfavorable. Studies meant to examine the ELM have introduced various significant variables that impact the elaboration process: mood, the recipient of the message, the number of message sources, and time pressure (Petty & Wegener, 1999). Although the influence of context, which is defined by all available alternatives in a choice set, has not been examined in prior studies relating to the ELM, it remains one of the prominent variables in persuading consumers to purchase a product. When consumers process given information or advertising messages with the intention of making a purchase, they must evaluate and compare information for all available options within the choice context. Thus, attitude toward a specific product or choice can be influenced by information for or evaluation of other alternatives. In this case, it is very important which options are included in the context.

Context effect, which is the impact of “the set of alternatives under consideration”, was introduced by Simon and Tversky (1992). According to several researchers, context effect is explained by the principle of tradeoff contrast. Tradeoff contrast describes the phenomenon by which a product appears more attractive when it is surrounded by less attractive alternatives than when it has a background containing more attractive options (Lynch, et al., 1991; Simonson & Tversky, 1992). Thus, depending on the choice set in which a specific product is presented, the preference for the product should differ. Simon and Tversky (1992) divided the context effect into two types: background context effect
and local context effect. Background context effect describes the case when past options influence a current choice; local context effect occurs when a target item is compared with current alternatives in the context. In the example of food selection at a restaurant, all available menu items should influence the choice of a particular menu item; this is an example of the local context effect. Thus, if nutritional information, one attribute by which menu items may be evaluated and judged, is provided on the menu, consumer food attitude or choice should be influenced by the nutritional values of other alternatives on the menu. On the other hand, past experiences of menu selection at other restaurants may be the reference point by which menu items in the current context are evaluated and judged. In this case, the information of menu items in past contexts influences the choice of a menu item in the current context; this is called the background context effect.

Based on the ELM and context effect models this study examined the effects that nutritional information disclosure on the menu and other significant factors may have on consumer food evaluation and choice. In this study, three different levels of nutritional information were provided and explored: (1) food description without nutritional information; (2) food description with information for the total calorie content only; and (3) food description with nutritional information including six key nutrition contents. Depending on the provided nutritional information levels, consumers’ nutritional attitude toward a menu item, their overall attitude toward a menu item, and their purchase intention are evaluated. This study also examined the roles that motivation to process nutritional information and nutritional knowledge play in consumer food evaluation. Finally, how the context effect affects evaluation and selection of a menu item depending on the level of nutritional information provided is investigated.
2.2 Nutritional Information on the Menu

2.2.1 The Influence of Providing Nutritional Information on the Menu

The effect that nutrition labels or nutrition claims have on consumers’ perceptions and purchase behavior for packaged food products consumed at home has been extensively demonstrated. Studies have explored this relationship from various perspectives: level of nutritional information (Burton & Andrews, 1996; Garretson & Burton, 2000), package design (Ford, Hastak, Mitra, & Ringold, 1996; Keller, et al., 1997), nutrition fact format (Kozup, Burton, & Creyer, 2006), message type (Andrews, Netemeyer, & Burton, 1998; Garretson & Burton, 2000), and demographics (Axelson & Penfield, 1983; Nayga, Lipinski, & Savur, 1998). They provided evidence that nutritional labels on packaged food products have significant associations with nutritional knowledge, attitudes toward food products, and increased use of label information in food choices (Burton & Andrews, 1996; Burton, et al., 1999; Garretson & Burton, 2000; Marietta, Welshimer, & Anderson, 1999).

Studies targeting restaurant menu choices have been recently completed with similar results found in the restaurant environment (Burton & Creyer, 2004; Cranage, et al., 2004; Hwang & Lorenzen, 2008; Kozup, et al., 2003). Cranage, et al. (2004) studied how providing nutritional information impacts customer satisfaction, purchase intention and healthy food choice. To find the effect of presented nutritional information, they chose hot entrée menu items in an on-campus café and analyzed the nutritional content of menu items using the USDA database. They collected sales data for the items over a two-week period during which nutritional information was not provided. They then provided nutritional information for the items, including portion size, calories, fat, calories from fat,
cholesterol, sodium, and protein, and collected data for another two weeks. The results of this study revealed that nutritional information disclosure at the point of purchase increased customer satisfaction for food quality and future purchase intention for the food; consumers may feel that they have been more responsible in their choice after being exposed to nutritional information. This research also concluded that consumers were willing to select more healthy foods when nutritional information was provided.

In order to examine consumer evaluation of menu items when providing health claims and nutritional information on the menu, Kozup, et al. (2003) conducted three different experiments. The first two experiments were designed to test the effects of nutritional information for a packaged food (a frozen lasagna) and a restaurant menu item (a lasagna entrée), respectively. Members of a consumer household research panel participated in the two experiments. The researchers assessed consumer evaluation measures (food and nutrition attitude, purchase intention, and source credibility) and disease risk measures (heart disease and stroke) associated with a certain product, depending on whether a heart healthy claim was presented on the product. Other nutritional values were also manipulated, such as favorable (healthy) or unfavorable (unhealthy) values, and the measures were reevaluated. For both the packaged food and the menu item, favorable nutritional information positively influenced consumers’ food evaluation and disease risk perception. In contrast, the heart health claim only affected consumer attitude toward the nutrition of the packaged food and the perceived source credibility for the menu item. Consumers’ food evaluation and disease risk perception for the menu item were also significantly affected by an interaction between the heart healthy claim and nutritional information provision. Thus, the provision of healthful nutritional
information with a heart healthy claim increased attitude toward nutrition, overall food attitude, and purchase intention, whereas providing unhealthful nutritional information with a heart healthy claim reduced consumers’ positive attitude toward a food and purchase intention.

In the third experiment conducted by Kozup, et al. (2003), a nutritional context variable was added. This additional variable measured the nutritional level of other available menu items. The researchers used three different chicken menu items and manipulated the nutritional values for one target item and the nutritional context, which included the nutritional information for the other two items. For this study, participants were recruited at a shopping mall. In contrast to the two prior experiments, in this experiment providing nutritional information about the target item had a significant impact only on attitude toward nutrition. Nutritional context, however, significantly affected food attitude, purchase intention, and disease risk perception.

Burton and Creyer (2004) built upon the third experiment conducted by Kozup et al. (2003). They focused on the effects of nutritional context by providing nutritional information. Using four different menu items, they manipulated the nutritional values of both healthy and unhealthy target items, while the nutritional values of all non-target items were also manipulated such that they appeared unhealthier than the target item. Consumers perceived an item as increasing their risk for heart disease and cancer in the case when nutritional information was present on the menu; the evaluation of nutrients such as fat, saturated fat, and cholesterol significantly differed depending on the presence of nutritional information. However, providing nutritional information did not have significant main effects on overall food attitude and purchase intention.
In recent research, Burton et al. (2006) demonstrated that consumers were not aware of the exact levels of nutrients in foods offered at a restaurant, and tended to underestimate the content of nutrients such as calories, fat, saturated fat, and sodium. In particular, the differences between the nutritional values expected by consumers and the actual values were greater for unhealthy foods than for healthy foods. Based on this result, the researchers conducted the experiment to explore how consumers change their attitudes, purchase intention, and food choices when their expected nutritional values differ from the provided actual values. For the test, they selected four different food items, and measured the expected nutritional values for each of the four items. Consistent with their survey, the expected nutritional values for two unhealthy items (chef’s salad and hamburger with fires) tended to be inconsistent with the actual nutritional values, while the expected values for the other two items (grilled chicken breast with baked potato and turkey sandwich), which are relatively healthy items, tended to be closer to the actual values. The results also showed that the presence of nutritional information on the restaurant menu had a significant main effect on food attitude, and consumers’ food choice was influenced by the level of nutritional information provided. When only total calorie count was presented, consumers were more likely to select a healthier menu item (turkey sandwich). On the other hand, the menu item type influenced all dependent variables: food attitude, perception of associated risk of weight gain and heart disease, and purchase intention. For the two foods with high calorie content and high fat content, the hamburger and chef’s salad, consumer purchase intention decreased when nutritional information was provided on the menu. Consumers also changed their food choice if actual calorie and fat content was higher than expected.
Accordingly, the provision of nutritional information helped consumers evaluate nutrients of menu items more accurately and led them to choose healthier foods at a restaurant.

Hwang and Lorenzen (2008) have also examined the effects of providing nutritional information on restaurant menus. Firstly, the researchers checked if consumers felt that different nutritional labeling on the menu was helpful in evaluating food healthiness. They provided five different levels of nutritional information: no information, only total calories, total calories plus macronutrients, total calories and macronutrients plus fat, and total calories, macronutrients, and fat plus fiber. They then measured how helpful consumers deemed the nutritional information presented on each label, as well as the perceived source credibility. As more nutritional information was added, consumers felt that the provided nutritional information was more helpful and more credible. Furthermore, consumer preference for a given menu item increased as additional nutritional information was provided. In the second study, researchers compared the nutrition related attitude, overall food attitude, and willingness to pay for an unhealthy menu item (southwest chicken sandwich) under three different conditions: no nutritional information, provision of nutritional information, and provision of nutritional information where the item was advertised as containing only 50% of the original fat content (low fat). When nutritional information was provided, consumers had a more unfavorable nutrition attitude, as well as a more negative overall food attitude. But consumers perceived that when the menu item was presented under the low fat condition with nutritional information, it was healthier than the item with original fat content. Thus, consumers recognized the change in fat content. Consumers were also likely to pay $2 more for the menu item under the low fat condition.
In conclusion, previous studies have demonstrated that providing nutritional information on the menu influences consumer food evaluation and choice. However, the influence of nutritional information disclosure on overall food attitude and purchase intention varied depending on other variables such as menu context and individual characteristics. In addition, most previous studies employed an unhealthy target menu item with unfavorable nutritional values. Thus, this study sought to determine the effect that nutritional information has on consumers’ food decisions in restaurants when other influential variables are held constant. Based on the literature reviewed herein, the following hypothesis is suggested:

H1: The presence of nutritional information on the menu will significantly influence consumers’ food decision making, especially consumers’ nutritional perception, overall food evaluation, and purchase intention.

2.2.2 The Influence of Nutritional Menu Context

There is evidence that consumers’ preferences and product choices are affected by choice context (Dhar, Nowlis, & Sherman, 1999; Simonson & Tversky, 1992). In comparing the utilities or subjective values associated with each alternative, the consumer tends to choose the alternative with the highest utility or subjective value. Thus, in analyzing consumer choice, it is very important to determine not only which products are in the choice set, but also which products act as comparisons. For instance, consumers were more likely to choose a product in a context consisting of alternatives with unique good features than in a context consisting of alternatives with unique bad features (Dhar, et al., 1999). Also, if consumers perceived that the nutritional values of the available
options were similar, they were more likely to search for additional information to
distinguish the products; this search behavior influenced the product evaluation and
decision behavior (Balasubramanian & Cole, 2002). But, the information search intensity
decreased with increasing similarity of nutrition across brands after the Nutrition
Labeling and Education Act legislation had been enacted. As a result, the nature of the
context effect on food choices when nutritional information is provided needs to be
further investigated; similarly, only a few studies have been conducted in the restaurant
setting (Burton & Creyer, 2004; Kozup, et al., 2003). This study addresses these
deficiencies.

Kozup, et al. (2003) explored whether providing nutritional information for
alternatives in a choice set influenced consumer food evaluation, purchase intention, and
disease risk perception in the restaurant setting. To test the menu context effect, they
selected three items (slow-roasted chicken, chicken marsala, and grilled chicken fajitas);
of these three items, one was designated the target menu item and two were designated
alternatives. The following three levels of information were provided for the nutrition
levels of both the target item and the menu context: no information, healthy and
unhealthy. The researchers assumed that the nutritional values of the target item would
act as a reference point by which all items on the menu would be evaluated. Thus, item
evaluation and purchase intention would be influenced by the nutritional menu context of
alternatives on the menu. They found that the nutritional context of alternative menu
items had a significant effect on attitude toward a menu item and purchase intention.
Specifically, the nutritional context significantly moderated the effects that health claims
and nutritional information had on consumer attitudes toward a menu item. Therefore,
the effect that healthy information about a target item had on consumers’ attitude toward that item and its nutrition was less pronounced when the nutrient contents of non-target items were healthy rather than when they were unhealthy.

Burton and Creyer (2004) built upon the experiment conducted by Kozup et al. (2003) in order to examine and identify the nutritional context effect. According to Simonson and Tversky (1992), consumers’ decision processes were affected by other options in a consideration set, which is referred to as the local context effect. Thus, Burton and Creyer (2004) suggested that consumers’ food evaluations and purchase behaviors at a restaurant should be affected by the nutritional context of alternatives on the menu. To test their proposal, they chose one target menu item (pot roast) and three non-target items (lasagna, chicken fajitas, and chicken chow mein). They provided three different levels of nutritional information for the target item (control, healthy, and unhealthy information), but only unhealthy information was presented for non-target items so as to provide an unhealthy context. Consumers’ food evaluations and disease risk perceptions were measured for the target item and for one of the non-target menu items. Compared to non-target menu items, attitudes toward the target item and purchase intention for the target item were positively evaluated when the nutritional information was offered. It was demonstrated that the presence of nutritional information for the non-target menu items significantly influenced the attitude and purchase intention for the target menu item. There also existed significant interaction effects between nutritional information and nutritional context on overall food attitude and purchase intention for the target menu item. The study showed that the nutrition levels of other options on the menu should be considered to be just as important as the provision of nutritional
Thus, the nutrition levels of alternatives in a menu context have significant effects on food evaluation, and also moderate the effects of nutritional information for the item itself. From the previous literature, the following hypotheses are identified:

H2: The nutritional menu context will significantly influence consumers’ food decision making, especially consumers’ nutritional perception, overall food evaluation, and purchase intention.

H3: The nutritional menu context will significantly moderate the effect that the presence of nutritional information has on consumers’ nutritional perception, overall food evaluation, and purchase intention.

2.2.3 The Role of Motivation to Process Nutritional Information

Consumers’ individual characteristics play an important role in the food purchase decision process. For instance, Burton and Andrews (1996) found that consumers’ age negatively influenced the ability to understand a nutrition label, and that education level was positively related to healthy food consumption (Saegert & Young, 1983; Yung, Contento, & Gussow, 1984). In addition to age and education level, various health characteristics have been considered in examining healthy behaviors: motivation to perform healthy behavior, health knowledge, health status, health locus of control, healthy behavior control, and income (Moorman & Matulich, 1993). Moorman and Matulich (1993) used these individual health characteristics in predicting consumer healthy behaviors such as health or label information acquisition from media, family, or friends, life-balancing behaviors, positive diet addition, negative diet restriction, alcohol
moderation, and tobacco nonuse. These healthy behaviors were undertaken as preventive measures, meant to avoid diseases or unhealthy states, and were divided into two groups: health information acquisition behaviors and health maintenance behaviors. Through a survey, the researchers measured all individual health characteristic variables and healthy behaviors, and identified the relationship between healthy behavior and individual characteristics. All health characteristic variables (motivation to perform healthy behavior, health knowledge, health status, health locus of control, healthy behavior control, age, education and income) were significant predictors of healthy behaviors. Motivation to perform healthy behaviors especially moderated the effects of all health characteristics on healthy behavior performance.

Among these individual health characteristics, the motivation to perform healthy behaviors and the nutritional knowledge variables have been considered in studies meant to identify the effects of nutritional information on healthy food choices. The reason for this is that knowledge and motivation to process information are key factors that affect perception and evaluation of given information (Petty, et al., 1983). Previous research studies have demonstrated the impact of nutritional knowledge and motivation to process nutritional information on consumer food decisions (Burton, et al., 1999; Droms, 2006; Keller, et al., 1997).

Motivation to perform healthy behaviors is one of the significant factors that influence healthy behaviors (Moorman & Matulich, 1993); this study focused specifically on nutritional information process behavior. Balasubramanian and Cole (2002) and Moorman (1990) investigated the nutritional information process, and identified the role that motivation to acquire and process nutrition related information plays in the process.
In both nutritional information process models, motivation to process nutritional information influenced information search behaviors and played a critical role in evaluations of the nutrition of a product. Thus, the role that motivation to process nutritional information plays in making healthy food decisions should be studied in a restaurant setting.

Keller, et al. (1997) found that nutritional claims, nutritional values, and motivation to process information impacted consumer evaluation and purchase intention for a packaged food product. The researchers developed four types of nutrition claims (no claim, 99% fat free, low fat, and low calorie) and manipulated the levels of nutritional values (poor, medium, and good) for a frozen chicken dinner. Utilizing members of a statewide household research panel, they measured each participant’s motivation to process information and several dependent variables including attitude toward nutrition, overall food attitude, perceived credibility of the product marketer, and purchase intention. The results indicated that consumers’ level of trust for the information provider significantly differed depending on the type of nutritional claims. It was also found that nutritional value had significant effects on all dependent variables: perceived credibility of the product marketer, nutrition attitude, overall product attitude, and purchase intention. However, there was no main effect of motivation to process information on consumer evaluation and purchase intention; motivation to process nutritional information did, however, moderated the effects of nutritional claims and nutritional value. Consumers with high motivation to process information had overall more favorable attitudes toward nutrition as well as toward the product, and were more likely to purchase a product when nutritional information was provided on the package. Therefore, motivation to process
nutritional information increases the accessibility of nutritional information and the probability that the information will be processed. It also moderates the relationship between nutritional information and consumers’ food evaluations.

A recent study investigated the tradeoff effect between carbohydrates and fat on disease risk perception, purchase intention, and nutrition perception when nutritional claims and nutritional information were provided (Kemp, Burton, Creyer, & Suter, 2007). Researchers again found that the motivation to acquire and process nutritional information had a moderating effect on the tradeoff effect. For this study, an experiment was developed with two manipulated variables, each with three levels; nutritional fact panel (no, low carbohydrate-high fat, and high carbohydrate-low fat), and nutritional claim (no, low fat, low carbohydrate). Participants, who were members of a household research mail panel for a southern state, were presented with one of the nine possible scenarios created by combining the variables above, and responded to questions meant to gauge motivation to process nutritional information, disease risk perception, nutrition perception, and purchase intention. Nutritional facts, including the nutritional information concerning the carbohydrate and fat contents of the product, impacted risk perception of heart disease and stroke and nutrition perception, while the nutritional claim variable only had a main effect on heart disease risk perception. The researchers also found that motivation to process nutritional information had a significant influence on the perceived risk of disease, but not on nutrition perception and purchase intention. In contrast, motivation to process nutritional information moderated the effect that the nutritional fact panel variable had on purchase intention. Thus, consumers with high motivation to process nutritional information were likely to have more positive purchase
intentions when nutritional information was provided.

Accordingly, this review suggests that consumers’ motivation to process nutritional information may moderate the main effects that nutrition level may have on nutrition perception.

H4: The motivation to process nutritional information will significantly moderate the effect that the presence of nutritional information has on consumers’ nutritional perception, overall food evaluation, and purchase intention.

2.2.4 The Role of Nutritional Knowledge

Nutritional knowledge is another critical factor that has been examined in a number of studies focusing on healthy eating behavior and food choice (Moorman, Diehl, Brinberg, & Kidwell, 2004; Wardle, Parmenter, & Waller, 2000). Nutritional knowledge refers to the ability to use nutrition and health information accurately (Moorman, 1993). In particular, there is evidence that nutritional knowledge plays an important role in how consumers use nutritional labels (Drichoutis, Lazaridis, & Nayga, 2005; Guthrie, Fox, Cleveland, & Welsh, 1995; Levy & Fein, 1998) as well as in food evaluations and choices (Andrews, et al., 1998; Droms, 2006; Kozup, et al., 2006).

Andrews, et al. (1998) investigated how the effects of nutritional ad claims were changed by nutritional knowledge in advertising. The purpose of this study was to identify the effects of nutritional claims depending on nutritional knowledge and disclosure type (none, absolute amount of fat in grams, relative to the daily value, evaluative), and ad claim type (no claim, general claim, and specific claim). From the pretest, researchers developed new objective measures of nutritional knowledge, and then
manipulated disclosure type and ad claim type (“delicious” for no claim, “healthy” for
general claim and “no cholesterol” for specific claim). They recruited participants in a
shopping mall and showed a target advertisement after displaying two clutter
advertisements. The results indicated that ad claim type influenced how respondents
evaluated fat content and healthiness, whereas disclosure type had an impact on how they
evaluated fat content, healthiness and perception of heart disease and cancer risk.
Nutritional knowledge had a significant main effect on how respondents evaluated fat
content, but did not affect the other variables. In the advertisement showing the amount
of fat in grams (absolute type), consumers with high nutritional knowledge more
positively evaluated the fat content, and perceived the risk of cancer accordingly, than did
consumers with low nutritional knowledge. Thus, the moderating effect of nutritional
knowledge was limited to the perception of fat content.

Andrews, et al. (2000) conducted a similar study to examine the direct effects of
nutritional knowledge on consumers’ nutrition evaluations of products and the
moderating effects on the relationship between disclosure type and evaluation of nutrients.
Similar to the previous study, respondents were presented with one of two different ad
types, general expression (“Now Healthier than Ever”) and specific phrase (“Now 1/3
Less Salt”), and one of four different nutrition interventions (none, absolute, relative,
evaluative) in an advertisement for Campbell’s soup. The researchers collected data from
mall shoppers, and measured their evaluations of sodium content and healthiness, the
perception of high blood pressure and coronary heart disease risks, claim believability,
and attitudes toward the ad and the brand. Nutritional knowledge had a significant main
effect only on the evaluation of healthiness of the food, and moderated the effect that
nutrient disclosure type had on the evaluation of sodium content and the risk perception of high blood pressure. Consumers with high nutritional knowledge more precisely evaluated the sodium content in evaluative disclosure type ads than they did in relative and absolute disclosure type ads. In contrast, nutritional knowledge did not have any impact on claim believability or on attitudes toward the ad and the brand.

The effect of nutritional knowledge was also investigated by Kozup, et al. (2006). The purpose of this study was to examine how nutritional knowledge and the presence of trans fat information affected consumer evaluations and perceptions of disease risk. The researchers focused on trans fat information since many foods such as crackers, snacks, fried foods, and fast foods contain trans fat that causes long term adverse health effects. To manipulate trans fat knowledge, the researchers artificially increased nutritional knowledge by providing respondents from a high knowledge group with an article which included trans fat information. They also manipulated the level of trans fat (no, low (1g), and high (4g)) as well as the format of the nutrition fact (a per serving basis, both a per serving and a per package basis). For this study, a box of snack crackers was selected as the target item, and university students served as subjects. Induced knowledge directly affected how respondents perceived the product in terms heart disease, stroke, and blood pressure risk, and also moderated the effect that the actual level of trans fat had on those three diseases risk perceptions. On the other hand, the level of trans fat had a significant effect on heart disease and stroke risk perception, while nutrition fact format influenced only blood pressure risk perception. Although induced knowledge and the level of trans fat did not directly affect perceived importance of trans fat and nutrition perception, the interaction effects between induced knowledge and level of trans fat were significant.
That is, consumers who were exposed to trans fat information considered trans fat as an important component of food and perceived food as being less nutritious when trans fat information was provided.

Most studies to date which focus on nutritional knowledge have been targeted toward packaged food products. However, Dorms (2006) has examined the role nutritional knowledge plays in dietary decision making in a restaurant setting. The first study, which sought to discover the effects nutritional information has on consumer food choices, did not obtain significant result. In order to identify other influential factors relating to the nutritional information process, the researcher measured various variables including self-esteem, self-objectification, and nutritional knowledge. Dorms (2006) also manipulated nutritional information of menu items offered by national chain restaurants; dietary restraint in food choices served as a dependent variable. The results indicated that self-esteem and self-objectification were significant predictors of dietary restraint and nutritional knowledge had a significant effect on food choice. That is, consumers high in nutritional knowledge intended to select the healthier menu item at a restaurant.

As a result, nutritional knowledge seems to play an important role in making food decisions. Based on the literature reviewed herein, the following hypothesis is offered:

H5: Nutritional knowledge will significantly moderate the effect that the presence of nutritional information has on consumers’ nutritional perception, overall food evaluation, and purchase intention.
Based on the proposed hypotheses, the following conceptual model of this study was developed.

![Conceptual Framework of the Study](image)

Figure 2.1: Conceptual Framework of the Study

### 2.3 Summary of Literature Review and Hypotheses

Previous literature provides enough evidence to show that consumers’ healthy eating behavior in a restaurant could be influenced by external factors such as nutritional information disclosure, as well as by consumers’ internal factors such as motivation to process nutritional information and nutritional knowledge. When nutritional information is offered at the point of purchase in a restaurant, consumers high in motivation to process and nutritional knowledge tend to process the given information and tend to compare with other alternatives on the menu using their knowledge ability. As a result, the final evaluation of menu items through this procedure should lead consumers to
purchase healthier items in a restaurant. Based on prior studies, following hypotheses are elicited, and the specific content of previous literature related to nutritional information is summarized in Table 2.2.

<table>
<thead>
<tr>
<th>Hypotheses</th>
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<tbody>
<tr>
<td>H1. The presence of nutritional information on the menu will significantly influence consumer food decision making, especially consumers’ nutritional perception, overall food evaluation, and purchase intention.</td>
</tr>
<tr>
<td>H2. The nutritional menu context will significantly influence consumers’ food decision making, especially consumers’ nutritional perception, overall food evaluation, and purchase intention.</td>
</tr>
<tr>
<td>H3. The nutritional menu context will significantly moderate the effect that the presence of nutritional information has on consumers’ nutritional perception, overall food evaluation, and purchase intention.</td>
</tr>
<tr>
<td>H4. The motivation to process nutritional information will significantly moderate the effect that the presence of nutritional information has on consumers’ nutritional perception, overall food evaluation, and purchase intention.</td>
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<tr>
<td>H5. Nutritional knowledge will significantly moderate the effect that the presence of nutritional information has on consumers’ nutritional perception, overall food evaluation, and purchase intention.</td>
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</tbody>
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Table 2.1: Proposed Hypotheses
<table>
<thead>
<tr>
<th>Studies</th>
<th>Sample</th>
<th>Target Food</th>
<th>Key Variables</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burton &amp; Andrews (1996)</td>
<td>Consumer research panel</td>
<td>Frozen chicken dinner product</td>
<td>Level of Nutritional Value (NV)</td>
<td>NA(^a) (+), PI(^b) (+), Nutrient Accuracy (+), Nutrition Information Awareness (0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nutrition Label Format</td>
<td>NA (0), PI (0), Nutrient Accuracy (+), Nutrition Information Awareness (0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>*Level of NV</td>
<td>NA (+), PI (+), Nutrient Accuracy (0), Nutrition information awareness (0)</td>
</tr>
<tr>
<td>Keller, et al. (1997)</td>
<td>Statewide household research panel</td>
<td>Frozen chicken dinner product</td>
<td>Nutrition Content Claim</td>
<td>NA (0), FA(^c) (0), Credibility (+), PI (0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Level of Nutrition Value</td>
<td>NA (+), FA (+), Credibility (+), PI (+)</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>Motivation*Claim</td>
<td>NA (+), FA (+), Credibility (0), PI (+)</td>
</tr>
<tr>
<td>Andrews, et al. (1998)</td>
<td>General consumers in 3 cities</td>
<td>Margarine product</td>
<td>Ad claim type</td>
<td>Fat content (+), Healthiness (+)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Disclosure type</td>
<td>Fat content (+), Healthiness (+)</td>
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<td></td>
<td></td>
<td></td>
<td>Nutritional knowledge</td>
<td>Fat content (+), Healthiness (0)</td>
</tr>
<tr>
<td>Kozup, et al. (2003)</td>
<td>Study 1 Consumer household research panel</td>
<td>Study 1 Frozen lasagna dinner</td>
<td>Study 1 Heart HC(^d)</td>
<td>NA(+), FA(0), Credibility(0), PI(0), Heart (+), stroke(+)</td>
</tr>
<tr>
<td></td>
<td>Study 2 Consumer household research panel</td>
<td>Study 2 Lasagna entrée</td>
<td>Study 2 Heart HC</td>
<td>NA(+), FA(+), Credibility(+),PI(+), Heart(+), stroke(+)</td>
</tr>
<tr>
<td></td>
<td>Study 3 Shoppers in a local mall</td>
<td>Study 3 Restaurant Menu items</td>
<td>Study 3 Heart HC</td>
<td>NA(0), FA(0), Credibility(+), PI(0), Heart(+), Stroke(+)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NI(^e)</td>
<td>NA(+), FA(+), Credibility(+),PI(+), Heart(+), Stroke(+)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nutritional context</td>
<td>NA(+), FA(0), Credibility(0), PI(+), Heart(+), Stroke(+)</td>
</tr>
</tbody>
</table>

Note: (+): significant effect, (0): no effect

a. Nutrition Attitude; b. Purchase Intention; c. Food Attitude; d. Healthy Claim; e. Nutritional Information

Table 2.2: Overview of Previous Studies
<table>
<thead>
<tr>
<th>Studies</th>
<th>Sample</th>
<th>Target Food</th>
<th>Key Variables</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cranage, et al. (2004)</td>
<td>University Students</td>
<td>Food items in on campus café</td>
<td>NI</td>
<td>Satisfaction with Food Quality (+),</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Intention to Repurchase (+), Healthy Food</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Choice (+)</td>
</tr>
<tr>
<td>Burton &amp; Creyer (2004)</td>
<td>Consumer household research panel</td>
<td>Restaurant Menu items</td>
<td>NI</td>
<td>NA (+), FA (0), PI (0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>HC (Cancer &amp; Heart)</td>
<td>NA (+), FA (0), PI (0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Nutritional Frame (NF)</td>
<td>NA (+), FA (+), PI (+)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NI* NF</td>
<td>NA (0), FA (+), PI (+)</td>
</tr>
<tr>
<td>Burton, et al. (2006)</td>
<td>Residents in a single south-central state</td>
<td>Restaurant Menu items</td>
<td>NI</td>
<td>FA (+), PI (0), Food Choice (+), Heart (+)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(None, Calorie, All)</td>
<td>FA (+), PI (+), Food Choice (+), Heart (+)</td>
</tr>
<tr>
<td>Dorms (2006)</td>
<td>Students and participants in a local</td>
<td>Restaurant Menu items</td>
<td>Study 1</td>
<td>Stage of behavior change (0), Food Choice</td>
</tr>
<tr>
<td></td>
<td>community</td>
<td></td>
<td>NI</td>
<td>(0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Study 2</td>
<td>Dietary restraint (+), Food Choice (+)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>NI*Healthy knowledge</td>
<td></td>
</tr>
<tr>
<td>Kozup, et al. (2006)</td>
<td>University students</td>
<td>Snack crackers</td>
<td>Level of Trans fat</td>
<td>Disease Risk (+), Perceived importance of</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Trans fat knowledge</td>
<td>trans fat (+)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Level*Knowledge</td>
<td>Disease Risk (+), Perceived importance of</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>trans fat (0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Disease Risk (+), Perceived importance of</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>trans fat (0)</td>
</tr>
<tr>
<td>Kemp, et al. (2007)</td>
<td>Household research mail panel</td>
<td>Frozen chicken dinner</td>
<td>Level of Nutrition</td>
<td>NA (+), PI (0), Heart (+), Stroke (+), Weight</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Type of HC</td>
<td>Gain (0)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Motivation*Level</td>
<td>NA (0), PI (0), Heart (+), Stroke (0), Weight</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Gain (0)</td>
</tr>
<tr>
<td>Hwang &amp; Lorenzen (2008)</td>
<td>Grocery shoppers</td>
<td>Menu item</td>
<td>Level of NI</td>
<td>NA (+), FA (+), Willingness to pay (+)</td>
</tr>
</tbody>
</table>
CHAPTER 3: METHODOLOGY

In the previous chapter, the conceptual model and five hypotheses were developed based on prior research studies. Their purpose was to examine the impact of nutritional information disclosure and the role of influential factors in processing nutritional information. To test the model and hypotheses an experimental design method was employed. An experimental method is one way to determine the causal relationship between variables by controlling for other confounding variables. In order to identify the effect of a certain variable, the treatment variable, it is very important to identify the expected sources of variability and also to design an experiment which reduces these sources of variability (Dean & Voss, 1999). The randomized experimental design method, in particular, is used to reduce some possible biases such as placebo effects. Thus, this study employed the randomized design method in order to obtain rigorous internal validity. This chapter describes the development of the experimental design of this study, the instruments associated with key variables, and the survey procedure used in this study.

3.1 Experimental Design

To verify the proposed hypotheses, a between-subject experimental design was applied with three levels of nutritional information (absence of nutritional information, total calories only, and nutritional information of five important nutrients in addition to
total calories), two nutritional levels of a target menu item (healthy and unhealthy), and two nutritional levels of menu context (healthier than the target item and unhealthier than the target item).

To test the effect of nutritional information on the menu and find the extent to which the level of nutritional information provided has an impact on consumer food evaluation, three different levels of nutritional information were provided: no nutritional information, which is considered a control group (CG), total calories only (TC), and nutritional information including six important nutrient contents (NI). According to Cranage et al. (2004), consumers use only a fraction of the nutritional information provided. In addition, the nutrition labeling regulations passed by several cities and states demonstrate the variety of nutritional information that can be included on menus. New York City, for instance, passed a law requiring that fast food outlets include only total calorie counts for menu items, whereas California requires total calories, saturated fat, carbohydrates, and sodium information to be included on menus. Thus, it is necessary to examine how different levels of nutritional information impact consumer choice rather than simply testing for the effects of including any information at all. For this study, the specific nutrition content for the NI Group was based on the definition of healthy food, passed regulations, and consumer evaluation of important nutrients through the pretest.

Two levels of nutritional value of the target menu item, healthy or unhealthy, were manipulated to examine the effect of nutritional information disclosure depending on the healthiness of a menu item. In previous studies, selected menu items investigated were mostly unhealthy items with high calories, fats, and sodium. However, nutritional
information may have a different effect depending on the healthiness of a menu item. Thus, this study tested the effects of provision of nutritional information for items of two different levels of nutrition, healthy and unhealthy items.

The nutritional level of a menu context was also manipulated by altering the nutritional values of alternatives in a menu context compared to the nutritional level of the target menu item. For this manipulation, two different nutritional levels of the target menu item and two different nutritional levels of a menu context were used. A total of 12 different scenarios from a $3 \times 2 \times 2$ design were developed. The specific experimental design is outlined in Table 3.1.

<table>
<thead>
<tr>
<th>Target Item</th>
<th>Menu Context</th>
<th>No Nutritional Information Group (Control Group)</th>
<th>Total Calorie only Information Group (TC Group)</th>
<th>Nutritional Information Group (NI Group)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy</td>
<td>Healthy</td>
<td>1</td>
<td>5</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Unhealthy</td>
<td>3</td>
<td>7</td>
<td>11</td>
</tr>
<tr>
<td>Unhealthy</td>
<td>Healthy</td>
<td>2</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Unhealthy</td>
<td>4</td>
<td>8</td>
<td>12</td>
</tr>
</tbody>
</table>

Table 3.1: Experimental Design

3.2 Measurement of Variables

3.2.1 Dependent Variables

To determine consumer food decision processes, three dependent variables were measured in this study: consumers perceived nutrition, overall attitude toward a menu
item, and purchase intention. The measures of these three variables were adopted from previous studies, but were modified for this study. All responses were measured using a five-point Likert-scale.

**Nutritional Perception**

Consumers’ nutritional perception was measured using three items which have been used in several previous studies (Burton & Creyer, 2004; Garretson & Burton, 2000; Kozup, et al., 2003). The three items were: “Based on the information provided on the menu, how important do you think a menu item would be as part of a healthy diet?” rated by a five-point Likert scale defined as 1= not important at all to 5=very important, “What level of nutrition do you think is suggested by the information regarding the menu item on the menu?” measured by a five-point Likert scale defined as 1=not nutritious at all to 5=very nutritious, and “ How healthy do you think the menu item on the menu would be?” rated by a five-point Likert scale defined as 1= very unhealthy to 5=very healthy.

**Overall Attitude toward a Menu Item**

The questions for overall attitude towards a menu item were chosen based on previous research (Burton & Andrews, 1996; Burton & Creyer, 2004; Garretson & Burton, 2000; Kozup, et al., 2003). Three questions were asked concerning the consumer’s overall attitude toward a given menu item. The specific questions were: “Overall, how much are you favorable toward a menu item?” measured by a five-point Likert scale defined as follows; 1=very unfavorable to 5=very favorable, “Overall, how much do you prefer a menu item?” rated by a scale defined by 1=very dislike to 5=very
like, “What is your overall feeling toward a menu item?” measured by a five-point scale defined by 1=very negative and 5=very positive.

*Purchase Intention*

Three items used in prior studies (Burton & Andrews, 1996; Burton & Creyer, 2004; Garretson & Burton, 2000; Kozup, et al., 2003) were utilized for assessing purchase intention of a menu item. The three items included measurements of the respondent’s interest in purchasing, willingness to purchase, and likelihood of purchasing a menu item, and were rated by a five-point Likert scale defined as follows: 1=not probable at all to 5=very probable for the first question, 1=not willingness at all to 5=very willingness for the second question, and 1=very unlikely to 5=very likely for the third question.

**3.2.2 Independent Variables**

*Nutritional Information*

In order to find the effect of nutritional information disclosure, three different levels of nutritional information were included as independent variables. One of three levels of nutritional information was provided on the menu: absence of nutritional information, total calories only, and nutritional information of six nutrients. These three categorical groups can be expressed using two dummy variables in data analysis. Thus, this information was recorded as two indicator variables to distinguish the level of nutritional information. For example, one dummy variable was assigned a value of 1 if total calories count was the only information provided; otherwise it was coded as 0. A
second dummy variable took on a value of 1 if nutritional information for the six nutrient
was offered on the menu; otherwise it took on a value of 0. The control group, where no
nutritional information was offered on the menu was indentified by assigning values of 0
to both dummy variables.

_Nutritional Menu Context_

According to the experimental design, two different menu contexts were tested: a
healthy context and an unhealthy context, depending upon the nutritional values of
alternatives offered on the menu. To test the main effect of menu context, nutritional
menu context was included as an independent variable, but the effects of menu context
were controlled for when other moderating variables such as motivation to process and
nutritional knowledge were tested. Nutritional menu context was also recorded as an
indicator variable which took on a value of 1 if the provided nutritional menu context was
healthy and 0 if it was unhealthy.

### 3.2.3 Moderating Variables

Measures of the following moderating variables were used in this study. They
were adopted from existing scales used in prior studies. Minor modifications were made
such that the scales were appropriate for a restaurant context. Except for the questions
about objective nutritional knowledge, which were measured using a multiple choice
question scale, the moderating variables were evaluated using a five-point Likert scale.
Motivation to Process Nutritional Information

Motivation to process nutritional information referred to consumers’ willingness to acquire and process nutritional information in the context of a restaurant (Moorman, 1993). Motivation to process nutritional information was measured using five items, all of which had been used in previous studies (Chandon & Wansink, 2007b; Kemp, et al., 2007; Moorman, 1990). The following five statements were presented, and respondents were asked to rate their level of accord with each statement using a five-point Likert scale defined as 1=strongly disagree to 5=strongly agree: “In general, I am interested in looking for nutritional information of menu items in a restaurant”, “In general, I pay attention to nutritional information while choosing a menu item in a restaurant”, “I would like to receive additional nutritional information about menu items in a restaurant”, “It is important to me that nutritional information is available on the menu”, and “I usually ignore nutritional information while choosing a menu item in a restaurant”.

Nutritional Knowledge

Nutritional knowledge refers to the ability to use nutritional and health information accurately (Moorman, 1993). To measure nutritional knowledge, both objective and subjective knowledge related questions were asked. Subjective nutritional knowledge was assessed by how participants rated their present level of nutritional knowledge. Three items developed by Moorman, et al. (2004) were used, and responses were measured using a five-point Likert scale defined as 1=strongly disagree to 5=strongly agree for the following statements: “Compared to most people, I am quite knowledgeable about nutritional information”, “Compared to most people, I am more
confident in using nutritional information to make a choice”, and “I feel confident about my ability to comprehend nutrition information on the menu”.

In measuring objective nutritional knowledge, a total of fifteen multiple choice questions were selected from a previous study (Andrews, et al., 1998), and from the ten-question nutrition quiz offered by the North Carolina Department of Agriculture and Consumer Services (NCDA&CS). Fifteen questions were selected from the two sources. Each is associated with important nutrients identified by previous studies and labeling laws; the difficulty level of each question was tested in the two pilot tests.

Table 3.2 displays the summary of study instruments for measuring the suggested variables.

<table>
<thead>
<tr>
<th>Variables</th>
<th>No. of Items</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perceived Nutrition</td>
<td>3</td>
<td>Burton &amp; Creyer (2004); Garretson &amp; Burton (2000); Kozup, et al. (2003);</td>
</tr>
<tr>
<td>Overall Attitude toward a menu item</td>
<td>3</td>
<td>Burton &amp; Andrew (1996); Burton &amp; Creyer (2004); Garretson &amp; Burton (2000); Kozup, et al. (2003)</td>
</tr>
<tr>
<td>Motivation to Process Nutritional Information</td>
<td>5</td>
<td>Chandon &amp; Wansink (2007b); Kemp, et al. (2007); Moorman (1990)</td>
</tr>
<tr>
<td>Objective Nutritional Knowledge</td>
<td>15</td>
<td>Andrew, et al. (1998); North Carolina Department of Agriculture and Consumer Services</td>
</tr>
</tbody>
</table>

Table 3.2: Study Instruments
3.2.4 Other Survey Questions

Besides the three main dependent variables, respondents were also asked to report which menu item they would choose to order. For each menu item, the expected taste and the credibility of provided nutritional information were assessed using one- and two-item Likert scales, respectively; the items were drawn from previous studies (Butron & Creyer, 2004; Kozup, et al., 2003). At the end of the survey, general questions about restaurant visits, sources of nutritional information, and health status were added. Demographic questions which asked respondents about age, gender, ethnicity, employment status, monthly income and monthly expenditure for food away from home were also included.

3.3 Pilot Study I

The goal of the first pilot test was to identify popular menu items and important nutrients that consumers consider when choosing a menu item in restaurants. Consumers’ perceived healthiness of menu items was also evaluated when the actual nutritional values were provided. Based on these results, nutritional values of menu items would be manipulated for the main survey.

The first pilot survey included undergraduate students at a large mid-western university as respondents. Students were asked to fill out the pilot study using a paper and pencil method. A total of 158 students voluntarily participated in the first pilot test, which took 15-20 minutes to complete.
3.3.1 Procedure

In the first pilot study, eight different menu items available at casual restaurants were provided on the menu, each with a description: Chicken Caesar Salad, Classic Sirloin, Lemon-Herb Roasted Chicken, Chicken Fajitas, Chicken Marsala, Grilled Salmon, Grilled Pork Chops, and California Turkey Club. After reading eight menu items with descriptions, participants were asked to list their three most preferred items from the list and also to select their top choice.

In the second section, participants answered sixteen questions meant to measure objective nutritional knowledge. They evaluated the importance of eleven nutrient contents that consumers usually use in making food choices in restaurants using a five-point Likert scale defined as 1=Not at all important to 5= Very important. Participants were also asked to rank the eleven nutrient contents in order of importance.

Finally, actual nutritional information of eight menu items was provided, along with a description of each item. The perceived nutritional level of each menu item was evaluated to check the level of provided nutritional values. Additionally, demographic information was collected. The questionnaire used for the first pilot study is included in Appendix A.

3.3.2 Data Analysis and Results

The collected data were analyzed using SPSS v.17 using various methods of analysis. Sixty-four percent of the participants were female with the majority of them between the ages of 19 and 23 (81%). Most were Caucasian (77%). Sixty-three percent of participants reported their monthly income to be less than $1,000, and half of them
(51%) spent between $100 and $200 on monthly food expenditures.

**Selection of Important Nutrition Content**

The first objective of this survey was to identify six important nutrients that should be presented on the menu for the nutritional information (NI) group. According to the average importance scores for the eleven nutrient contents, total calories (mean=3.54 out of 5) was the most important contributor when choosing a menu item in a restaurant, then total fat (mean=3.44), protein (mean=3.29), and trans fat (mean=3.28). Similar results were found in the ranking analysis. Forty-three percent of respondents ranked total calories as most important, while total fat was placed first or second by thirty-four percent of respondents. Also, calories from fat, trans fat, protein, and saturated fat were highly ranked. The top six nutrient contents were therefore: total calories, total fat, trans fat, calories from fat, saturated fat, and protein. However, several of the six nutrient contents such as calories from fat and protein are not included in the definition of healthy food by the Food and Drug Administration (FDA, 1999) and are not included in any enacted menu labeling laws. According to the definition of healthy food, the amount of total fat, saturated fat, cholesterol, and sodium are important when deciding if food is healthy or not. California requires a listing of total calories, saturated fat, carbohydrates, and sodium. Philadelphia added trans fat to those requirements. In short, total calories, total fat, saturated fat, and sodium are critical nutrient contents that consumers need to consider when selecting a menu item. Similarly, cholesterol is also included in the definition of healthy food. Thus, for this study, the following six nutrient contents were selected and were placed on the menu for the (NI) group: total calories, total fat,
Decision of Nutritional Values of Menu Items

In order to achieve the second objective of pilot testing, the reported perceived nutritional values for the eight menu items were analyzed. The goal of this analysis was to identify the levels of healthiness of menu items so that the appropriate nutritional values used in the main experiment were manipulated. Analysis of variance (ANOVA) revealed that the perceived nutritional values of the eight menu items were significantly different from one another, and the results of the Post Hoc test indicated that the eight items could be categorized into three groups depending upon their perceived nutritional values ($F=97.5$, d.f.=$(7, 1250)$, $p \leq 0.001$). Among the eight items, the Grilled Salmon (mean=4.10 out of 5) and the Lemon Herb Roasted Chicken (mean=4.03) were perceived as healthier items, which included 15% to 20% of the daily recommended amounts of fat, saturated fat, and sodium based on a 2,000 calories diet. On the other hand, the Chicken Caesar Salad (mean=2.46), the Chicken Marsala (mean=2.62), and the Chicken Fajitas (mean=2.64) were considered relatively unhealthy items. Unhealthy menu items contained 70% to 80% of the recommended daily amounts of fat, saturated fat, and sodium. These results agreed with the manipulated levels used in previous studies (Burton, et al., 2006; Hwang & Lorenzen, 2008; Kozup, et al., 2003) where the nutritional values of healthy food were set at 15% to 20% of the daily recommend values, and the nutritional values of unhealthy foods were set at 50% to 60% of the daily recommended values. Thus, the nutritional values for the healthy target item were set such that the food accounted for 20% of the recommended daily values of fat, saturated
fat, cholesterol, and sodium. For items in the healthy menu context, the nutritional values of the two alternatives items were manipulated such that they accounted for 12% and 10% of recommended daily values, respectively. The unhealthy target item was made to account for around 60% of recommended daily values, and the unhealthy menu context included two alternative options containing 65% and 70% of the recommended daily values, respectively. The amount of protein for each item was set such that it was inversely related to the amounts of fat, cholesterol and sodium contained in the item. For instance, healthy items include 60% to 70% of daily recommended values of protein. Total calories information for the six menu items was set based on the actual total calorie counts of each menu item, but some modifications were made depending on the manipulated level of daily values for other provided nutrients. The manipulated nutritional values of menu items were similar to their actual values so that it was possible to control for the effects of actual healthiness of menu items. Table 3.3 shows the perceived nutrition level of menu items.
<table>
<thead>
<tr>
<th>Item</th>
<th>Nutritional Perception (^a) (Mean, S.D.)</th>
<th>Preference (^b) (Frequency, %)</th>
<th>Choice (Frequency, %)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chicken Caesar Salad</td>
<td>2.46 (0.80)</td>
<td>77 (16.3%)</td>
<td>17 (10.8%)</td>
</tr>
<tr>
<td>Grilled Salmon</td>
<td>4.10 (0.72)</td>
<td>72 (15.3%)</td>
<td>35 (22.2%)</td>
</tr>
<tr>
<td>Lemon Herb Roasted Chicken</td>
<td>4.03 (0.65)</td>
<td>42 (8.9%)</td>
<td>8 (5.1%)</td>
</tr>
<tr>
<td>Chicken Marsala</td>
<td>2.62 (0.84)</td>
<td>42 (8.9%)</td>
<td>10 (6.3%)</td>
</tr>
<tr>
<td>Chicken Fajitas</td>
<td>2.64 (0.71)</td>
<td>76 (16.1%)</td>
<td>28 (17.7%)</td>
</tr>
<tr>
<td>Classic Sirloin Steak</td>
<td>3.05 (0.81)</td>
<td>71 (15.1%)</td>
<td>34 (21.5%)</td>
</tr>
<tr>
<td>Grilled Pork Chop</td>
<td>3.27 (1.06)</td>
<td>29 (6.2%)</td>
<td>5 (3.2%)</td>
</tr>
<tr>
<td>Italian Turkey Sandwich</td>
<td>3.30 (0.70)</td>
<td>62 (13.2%)</td>
<td>19 (12.0%)</td>
</tr>
</tbody>
</table>

Note: a. The mean value of three items when the actual nutritional values were provided, which were measured using the a five-point Likert scale, and 5 is the highest value representing very healthy
b. Multiple Responses (Three out of Eight items)

Table 3.3: Evaluation of Menu Items

*Check of Objective Nutritional knowledge*

The third objective of the pilot study was to construct the objective nutritional knowledge questions. The sixteen selected nutritional knowledge questions were analyzed to confirm the measures. The mean score for the nutritional knowledge questions was 9.8 out of 16 points with standard deviation 2.26 (the median score was 10). There were three difficult questions for which fewer than 22% of respondents provided correct answers and five relatively easy questions with more than 80% of answers correct. The rates of correct answers for the other 8 questions were between 50% and 80%. To better discriminate between levels of objective nutritional knowledge, two questions related to fat were deleted because for both questions, 53% of answers were
correct and 27% of answers were “don’t know”. Instead, one difficult question related to fat was added that 27% of respondents had correctly answered in a previous study (Andrews, et al., 1998). All other questions were kept in the second pilot test.

**Selection of Menu Items**

Regarding menu items, Chicken Caesar Salad (16.3%), Chicken Fajitas (16.1%), Grilled Salmon (15.3%), and Classic Sirloin Steak (15.1%) tended to be included in respondents top-three items; the top choice among the three preferred items was the Grilled Salmon (22.2%). But, the Classic Sirloin Steak (21.5%) and the Chicken Fajitas (17.7%) were also chosen with similar frequencies. Because of this, Grilled Salmon and Chicken Fajitas were selected as healthy and unhealthy target items (See Table 3.3). However, to reduce the effects of food preference, the base ingredient of all selected menu items was changed to chicken. According to Farm Animal Statistics estimated by The Human Society of the U.S. (HSUS), the most commonly consumed meat in 2004 was chicken (85 pounds per person), which was followed by beef (65 pounds per person) and pork (51 pounds per person). The amount of chicken consumed in the U.S. has been continuously increasing, reflecting that Americans enjoy eating more chicken and that it is becoming a popular food source. Because of this, the Grilled Salmon and the California Turkey Club Sandwich were replaced with the Grilled Chicken and the Italian Chicken Sandwich. The Classic Sirloin Steak, one of the popular items, was excluded from the menu because it was not easy to find a substitutable chicken item. To create a menu context including two alternative chicken items, the Lemon Herb Roasted Chicken and the Italian Chicken Sandwich were selected to create the healthy menu context, while
the Chicken Caesar Salad and the Chicken Marsala were provided for an unhealthy menu context. Thus, the following six menu items were selected to be used for the main experiment: Lemon Herb Roasted Chicken, Grilled Chicken, Italian Chicken Sandwich, Chicken Fajitas, Chicken Marsala, and Chicken Caesar Salad.

To check the perceived healthiness of the six selected menu items and the manipulation of nutritional values of each, a second pilot test was conducted. In addition, the reliability and construct validity of all measures were tested.

3.4. Pilot Study II

The aim of the second pilot study was to check the consumer perceived healthiness of the selected menu items without nutritional information, as well as the manipulation of nutritional values of menu items. The reliability of all measures was also tested. A total of 94 undergraduate students volunteered to take part in the second pilot study; each received extra course credit as an inducement to participate.

3.4.1 Procedure

The questionnaire asked respondents to evaluate six menu items, and to answer objective nutritional knowledge questions, individual characteristic questions, and demographic information questions. The six menu items were presented in a random order, and the order in which the menu items were presented was also rotated to reduce the order effect. To test the effect of the level of nutritional information, three different levels of nutritional information were provided with the description of each menu item: absence of nutritional information, total calories only, and nutritional information of six
nutrient contents. Participants were randomly assigned to receive one of the three levels of nutritional information.

Participants responded to questions that measured how they perceived the nutrition of each item, their overall attitude toward a menu item, and their purchase intention for each of six menu items; they were also asked to choose one of six menu items.

In the second section, participants were asked to answer fifteen nutritional knowledge questions, while the third section asked about consumers’ individual characteristics such as subjective nutritional knowledge, motivation to process nutritional information, and future behavior intention related to the use of nutritional information. Lastly, general questions about restaurant visits and demographic information such as gender, age, income and ethnicity were asked. The questionnaire is attached in Appendix B.

3.4.2 Data Analysis and Results

Sixty-three percent of respondents were female; eighty-eight percent were Caucasian. The majority of respondents (92%) were between the ages of 18 and 23. Most of the respondents (77%) reported that their monthly income was less than $1,000; fifty percent of respondents estimated that their monthly expenditures for food away from home were between $100 and $200. Sixty-two percent of respondents visited restaurants once or twice during a week, and the major nutritional information sources used were restaurant websites (37%) or menus (29%).

The perceived nutritional level of the six menu items without nutritional
information was checked to manipulate the control group. The results of analysis of variance (ANOVA) showed that there were significant differences in nutritional perception among six menu items without nutritional information ($F=20.8$, d.f.=(5, 234), $p\leq 0.001$). In particular, the Post Hoc test revealed that consumers perceived that the nutritional levels of the Chicken Fajitas (mean=2.67 out of 5), the Chicken Marsala (mean=3.04), and the Chicken Caesar Salad (mean=3.10) significantly differed from the nutritional levels of the Italian Chicken Sandwich (mean=3.40), the Lemon Herb Roasted Chicken (mean=3.69), and the Grilled Chicken (mean=4.24). As would be expected, the first three menu items, the Chicken Fajitas, the Chicken Marsala, and the Chicken Caesar Salad, were selected as unhealthier menu items, while the Italian Chicken Sandwich, the Lemon Herb Roasted Chicken, and the Grilled Chicken were chosen as healthier items. Table 3.4 displays the mean values of perceived nutritional levels for the six menu items when nutritional information was not presented.

<table>
<thead>
<tr>
<th>Healthy Item</th>
<th>Mean (St.dev.)</th>
<th>Unhealthy Item</th>
<th>Mean (St.dev.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Italian Chicken Sandwich</td>
<td>3.40 (0.72) b</td>
<td>Chicken Caesar Salad</td>
<td>3.10 (0.91) c</td>
</tr>
<tr>
<td>Lemon Herb Roasted Chicken</td>
<td>3.69 (0.68) b</td>
<td>Chicken Fajitas</td>
<td>2.67 (0.73) c</td>
</tr>
<tr>
<td>Grilled Chicken</td>
<td>4.24 (0.75) a</td>
<td>Chicken Marsala</td>
<td>3.04 (0.77) c</td>
</tr>
</tbody>
</table>

$F=20.8$ (d.f.=5, 234), $p\leq 0.001$

Note: a, b, and c are significantly different at the level of 0.05.

Table 3.4: Mean Values of Nutritional Perception of Menu Items

Similar to the results of the first pilot test, the Chicken Fajitas (23%) and the
Grilled Chicken (22%) were the most popular menu items. The Chicken Fajitas was selected as the unhealthy target item, and the Chicken Marsala and the Chicken Caesar Salad were chosen as the unhealthy alternatives to manipulate the unhealthy menu context. For the healthy target item, the Grilled Chicken was used since it was the most popular item among three healthier items; however, the nutritional perception of the Grilled Chicken became more negative as nutritional information was added (mean=4.24 without nutritional information; mean=3.97 with only total calories; mean=3.78 with nutritional information). It is possible that while consumers perceived the Grilled Chicken to be very healthy, once they had been provided with the healthy nutritional information of the Grilled Chicken, they realized it was not as healthy as expected. As a result, the Lemon Herb Roasted Chicken, which was chosen by eighteen percent of respondents, was selected as the healthy target item since the Lemon Herb Roasted Chicken did not have a large fluctuation in the perceived healthiness. The Grilled Chicken and the Italian Chicken Sandwich were provided on the menu as healthier options for the healthy menu context. The fact that the Grilled Chicken appeared less healthy when nutritional information was provided also influenced the manipulated nutritional values for both the Grilled Chicken and the Lemon Herb Roasted Chicken. In order to maintain similar levels (12%) of nutritional values for the Lemon Herb Roasted Chicken as those presented in the second pilot test, the nutritional values of the healthy target item were slightly adjusted such that they accounted for 15% of daily recommended values. This adjustment was necessary because the nutritional values of the healthy target item had to be higher than the levels of the other healthy alternatives. On the other hand, the nutritional values of the Grilled Chicken were changed to account
for 8% of daily recommended values because it was perceived as the healthiest item among six menu items and the actual nutritional values (20%) made this item appear too unhealthy. The nutritional levels of the Italian Chicken Sandwich were maintained at their prior level in the second pilot test (10% of recommended values). The manipulated nutritional values of the six menu items were very close or even healthier than the actual nutritional values, and they are shown on the Table 3.5.

The second pilot study also provided an opportunity to check the modified objective nutritional knowledge questions. The mean score was 8.7 out of 15 questions (median=9). The results of the second pilot test revealed that there were four difficult questions and five easy questions. The reliabilities of all measures were tested and Cronbach’s alpha of all instruments met the acceptable level; all Cronbach’s alpha values were larger than 0.85. Thus, without any modifications, all measures were used in the main survey.
<table>
<thead>
<tr>
<th>Nutrition Content</th>
<th>Healthy Menu Item</th>
<th>Unhealthy Menu Item</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Target Item</td>
<td>Alternative 1</td>
</tr>
<tr>
<td>Total calories</td>
<td>420</td>
<td>380</td>
</tr>
<tr>
<td>Total Fat</td>
<td>9g (14% DV)</td>
<td>6.5g (10% DV)</td>
</tr>
<tr>
<td>Saturated Fat</td>
<td>3g (15% DV)</td>
<td>2g (10% DV)</td>
</tr>
<tr>
<td>Cholesterol</td>
<td>45mg (15% DV)</td>
<td>36mg (12% DV)</td>
</tr>
<tr>
<td>Sodium</td>
<td>384mg (21% DV)</td>
<td>264mg (11% DV)</td>
</tr>
<tr>
<td>Protein</td>
<td>31g (62% DV)</td>
<td>34g (68% DV)</td>
</tr>
<tr>
<td>Manipulated Level</td>
<td>15% DV</td>
<td>10% DV</td>
</tr>
</tbody>
</table>

Note: The percent daily values are based on a 2,000 calorie diet.

Table 3.5: Manipulated Nutritional Values of Menu Items
3.5 Primary Study

3.5.1 Sample

The sample selected for this study consisted of undergraduate and graduate students at a large mid-western university. The study was announced to undergraduate students who were enrolled in marketing or hospitality management courses; any student enrolled in these courses could sign up to participate. In order to recruit graduate students, an email was sent to all graduate students in the home department. Potential participants were offered incentives to participate in the study. Namely, undergraduate students were offered extra points in selected courses, while graduate students were offered $5 gift cards.

3.5.2 Sample Size

To assure reasonable power for the various analyses, the sample size was calculated using the formula suggested by Dean and Voss (1999). Using the Tukey multiple pair-wise comparisons of main factors, the sample size was calculated based on a set of 95% simultaneous confidence intervals for identifying significant pair-wise differences between the levels of nutritional information. The formula for the confidence interval is:

\[
\text{Mean difference between two levels} \pm q_{a,r(c-1),0.05} \sqrt{\frac{2}{n}} \sqrt{\frac{msE(\frac{2}{b_{CX}})}{msd}}
\]

Where:

- \(a\) = level of nutritional information = 3
- \(b\) = level of healthiness of a target item = 2
- \(c\) = level of healthiness of a menu context = 2
\[ v = \text{number of condition} = 3 \times 2 \times 2 = 12 \]

\[ x = \text{sample size in a condition} \]

A reasonable estimate of the mean square error (MSE) was obtained from the data collected in the second pilot study; estimates ranged from 0.47 to 0.88 depending on the menu item at hand. The largest value, 0.88, was used as the estimate of the MSE in the sample size calculation. Assuming an equal sample size for each condition, the acceptable minimum significant difference (msd) was set at 0.2, a value which was based on the result of the second pilot test. Thus, the following formula was developed:

\[
\frac{q_{3,12(x-1),0.05}}{\sqrt{2}} \times \sqrt{(0.88)^2 \left( \frac{2}{4x} \right)} \leq 0.2 \Rightarrow q_{3,12(x-1),0.05}^2 \leq 1.037x
\]

The value of \( q_{a,v(x-1),0.05} \) was chosen from the Tukey’s method table (Dean & Voss, 1999); the appropriate sample size per condition (x) was identified by setting both sides of the equation equal to one another.

When \( x=10 \), \( q_{3,108,0.05}^2 = 3.68^2 = 13.54 > 10.03 = 1.037 \times 10 \) → increase \( x \)

When \( x=13 \), \( q_{3,144,0.05}^2 = 3.63^2 = 13.17 \approx 13.39 = 1.037 \times 13 \)

Thus, each condition required at least 13 participants, which made the total required number of participants at least 156 (=13×12).

In addition, the necessary sample size for this study was estimated using the sample size calculator software, PASS 2008. The software’s method was based on a multiple regression model that was employed for testing proposed hypotheses. By providing the desired power, significance level and number of independent variables, the software is then able to calculate the necessary sample size. It was expected that a power level of 0.8 was sufficiently strong to detect the size of the effects of the independent
variables (Frazier, Tix, & Barron, 2004), and the sample size was generated to assure estimates significant at the 0.05 significance level. Additionally, the model with the most possible independent variables was specified. This model would contain five independent variables, including the two indicator variables indicating the three levels of nutritional information, the nutritional knowledge variable, and two interaction terms between nutritional knowledge and nutritional information. It would also contain the information of control variables: the two dummy variables meant to control for the effects of menu context and the healthiness of the target item, were also included. This information with expected overall R² values was entered into the software. The software produced a sample size estimate of 250, which would achieve 80% power to detect 0.05 R² using five independent variables with two control variables.

Thus, the sample size objective was 250 participants, with at least 13 participants per condition.

3.5.3 Study Procedure

To collect the data, a self-administered survey was conducted in a computer lab using the Media Lab computer program. The data were collected over the course of three weeks, from April 13 to April 30. Participants were randomly assigned to one of the twelve scenarios and allowed 30 minutes to complete the survey.

An introduction page that explained the study and the procedure was presented, and then participants were shown a menu that included three different items with or without nutritional information. The menu used in the experiment is attached in Appendix C. Questions were presented one by one on the screen, and participants were
able to see the designed menu while they answered all questions so that they responded to each question by comparing menu items without being required to guess or remember the provided information.

Participants were asked to answer questions about the expected taste of a menu item, nutritional perception, overall attitude toward a menu item, purchase intention, and source credibility. Nutritional knowledge questions, the measure of motivation to process nutritional information questions, health related questions, and demographic questions followed in sequence.

3.5.4 Data Analysis

The data were analyzed using SPSS version 17.0 Windows. For testing the reliability and internal validity of measures, reliability analysis using Cronbach’s alpha and exploratory factor analysis (EFA) were utilized. Additionally, analysis of variance (ANOVA) was executed for checking the manipulation of the nutritional values of the menu items. For the hypothesis tests, multiple regression analysis was conducted. Furthermore, to test the moderating effects of nutritional menu context, motivation to process, and nutritional knowledge, a hierarchical multiple regression method was used.
CHAPTER 4: RESULTS

4.1 Sample

A total of 319 observations were collected and included in the analysis.

Approximately 27 participants were assigned to each of the twelve conditions (See Table 4.1).

Table 4.1: Sample Size

<table>
<thead>
<tr>
<th>Target Item</th>
<th>No Nutritional Information Group (Control Group)</th>
<th>Total Calorie only Information Group (TC Group)</th>
<th>Nutritional Information Group (NI Group)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Menu Context</td>
<td>Menu Context</td>
<td>Menu Context</td>
</tr>
<tr>
<td>Healthy</td>
<td>27</td>
<td>27</td>
<td>26</td>
</tr>
<tr>
<td>Unhealthy</td>
<td>27</td>
<td>26</td>
<td>27</td>
</tr>
</tbody>
</table>

The sample contained equal numbers of male and female participants, and the majority of respondents (70%) were Caucasian. Ninety-two percent of respondents were undergraduate students and were an average age of 22 years. The average monthly income was $743.02 and ranged between $0 and $5,400; twenty-eight percent of respondents reported their monthly income as $0, a fact which might be due to the
student sample. Respondents spent an average $212.72 per month on food away from home. Ninety-seven percent of respondents were non-vegetarian, and many reported that their favorite food was beef (34%) or chicken (29%), as was expected. On average, respondents ate at restaurants three times during a week; the number of weekly restaurant visits ranged between 0 and 12. Further, participants reported eating at fast food restaurants on average twice per week. The major sources from which respondents obtained nutritional information included menus (25%), restaurant websites (24%), or other websites (22%) like Yahoo or Google. Other information sources included word of mouth from family or friends and publications, such as books or magazines. Most respondents (97%) reported that their current health status was good (mean=3.9 out of 5), and that they were mainly concerned with diets for health reasons (mean=4.24 out of 5) rather than for the weight loss reasons (mean=3.66). Using the reported respondents’ weight in pounds and height in inches, Body Mass Index (BMI) was calculated using the following formula: [weight ÷ (height)²] × 703 (CDC, 2009). Most of the respondents (70%) were normal weight with BMIs between 18.5 and 24.9, while twenty-four percent of respondents having BMIs greater than 25 were overweight or obese. Table 4.2 displays the specific demographic information of respondents in this study.
<table>
<thead>
<tr>
<th></th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>160</td>
<td>50.2%</td>
</tr>
<tr>
<td>Female</td>
<td>159</td>
<td>49.8%</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>224</td>
<td>70.2%</td>
</tr>
<tr>
<td>African American</td>
<td>13</td>
<td>4.1%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>2</td>
<td>0.6%</td>
</tr>
<tr>
<td>Asian</td>
<td>78</td>
<td>24.5%</td>
</tr>
<tr>
<td>Native American</td>
<td>1</td>
<td>0.3%</td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
<td>0.3%</td>
</tr>
<tr>
<td><strong>Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Undergraduate</td>
<td>293</td>
<td>91.8%</td>
</tr>
<tr>
<td>Graduate</td>
<td>23</td>
<td>7.5%</td>
</tr>
<tr>
<td>Staff</td>
<td>2</td>
<td>0.6%</td>
</tr>
<tr>
<td><strong>Vegetarian</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>9</td>
<td>2.8%</td>
</tr>
<tr>
<td>No</td>
<td>310</td>
<td>97.2%</td>
</tr>
<tr>
<td><strong>Type of Favorite Food</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beef</td>
<td>109</td>
<td>34.2%</td>
</tr>
<tr>
<td>Pork</td>
<td>6</td>
<td>1.9%</td>
</tr>
<tr>
<td>Chicken</td>
<td>93</td>
<td>29.2%</td>
</tr>
<tr>
<td>Lamb</td>
<td>7</td>
<td>2.2%</td>
</tr>
<tr>
<td>Turkey</td>
<td>14</td>
<td>4.4%</td>
</tr>
<tr>
<td>Seafood</td>
<td>64</td>
<td>20.1%</td>
</tr>
<tr>
<td>Others</td>
<td>26</td>
<td>8.2%</td>
</tr>
<tr>
<td><strong>Nutritional Information Source a</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TV</td>
<td>93</td>
<td>11.7%</td>
</tr>
<tr>
<td>Restaurant Website</td>
<td>191</td>
<td>24.1%</td>
</tr>
<tr>
<td>Other Website</td>
<td>173</td>
<td>21.8%</td>
</tr>
<tr>
<td>Newspaper</td>
<td>35</td>
<td>4.4%</td>
</tr>
<tr>
<td>Menu</td>
<td>197</td>
<td>24.8%</td>
</tr>
<tr>
<td>Ask to the server</td>
<td>58</td>
<td>7.3%</td>
</tr>
<tr>
<td>Others</td>
<td>46</td>
<td>5.8%</td>
</tr>
<tr>
<td>Total</td>
<td>793</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 4.2: Demographics of the Sample
Table 4.2 continued

<table>
<thead>
<tr>
<th></th>
<th>Mean (S.D.)</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>22.34 (4.33)</td>
<td>21</td>
</tr>
<tr>
<td>Monthly Income ($)</td>
<td>743.02 (872.16)</td>
<td>500.00</td>
</tr>
<tr>
<td>Monthly Expenditure on FAFH ($)</td>
<td>212.72 (163.85)</td>
<td>200.00</td>
</tr>
<tr>
<td>Restaurant Visit (#)</td>
<td>2.99 (2.26)</td>
<td>2</td>
</tr>
<tr>
<td>Fast-food Restaurant Visit (#)</td>
<td>1.94 (1.85)</td>
<td>1</td>
</tr>
<tr>
<td>Current Health Status b</td>
<td>3.97 (0.77)</td>
<td>4</td>
</tr>
<tr>
<td>Health Status in past 5 yrs b</td>
<td>4.56 (0.81)</td>
<td>5</td>
</tr>
<tr>
<td>Diet for Health c</td>
<td>4.24 (0.85)</td>
<td>4</td>
</tr>
<tr>
<td>Diet for Weight Loss c</td>
<td>3.66 (1.26)</td>
<td>4</td>
</tr>
<tr>
<td>Body Mass Index</td>
<td>23.20 (3.69)</td>
<td>22.77</td>
</tr>
</tbody>
</table>

Note: a. Multiple Responses (at most three)
   b. Measured by 5 point Likert Scale ranged from 1=very poor to 5=very good
   c. Measured by 5 point Likert Scale ranged from 1=not interested at all to 5=very interested

4.2 Reliability and Internal Validity of Measures

Exploratory factor analysis (EFA) was conducted to check the internal validity of continuous variables including the three dependent variables: motivation to process, subjective nutritional knowledge, and source credibility. A total of 19 items for 6 variables were included in the analysis using a Principle Component method with a Varimax rotation. According to the result of the EFA, five components were identified which had eigenvalues greater than 1.0 and which explained 82% of total variance. The result revealed that measures of overall food attitude and purchase intention were identified as one dimension, but that the other variables were clearly identified. Table 4.3 summarizes the factor loadings with total explained variances for each factor.
<table>
<thead>
<tr>
<th>Scale Items</th>
<th>Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall Attitude toward a Item Q1</td>
<td>0.88</td>
</tr>
<tr>
<td>Overall Attitude toward a Item Q2</td>
<td>0.91</td>
</tr>
<tr>
<td>Overall Attitude toward a Item Q3</td>
<td>0.90</td>
</tr>
<tr>
<td>Purchase Intention Q1</td>
<td>0.95</td>
</tr>
<tr>
<td>Purchase Intention Q2</td>
<td>0.94</td>
</tr>
<tr>
<td>Purchase Intention Q3</td>
<td>0.93</td>
</tr>
<tr>
<td>Motivation to Process Q1</td>
<td>0.88</td>
</tr>
<tr>
<td>Motivation to Process Q2</td>
<td>0.87</td>
</tr>
<tr>
<td>Motivation to Process Q3</td>
<td>0.85</td>
</tr>
<tr>
<td>Motivation to Process Q4</td>
<td>0.84</td>
</tr>
<tr>
<td>Motivation to Process Q5 (R) ^a</td>
<td>0.80</td>
</tr>
<tr>
<td>Nutritional Perception Q1</td>
<td>0.86</td>
</tr>
<tr>
<td>Nutritional Perception Q2</td>
<td>0.87</td>
</tr>
<tr>
<td>Nutritional Perception Q3</td>
<td>0.89</td>
</tr>
<tr>
<td>Subjective Nutritional Knowledge Q1</td>
<td>0.87</td>
</tr>
<tr>
<td>Subjective Nutritional Knowledge Q2</td>
<td>0.76</td>
</tr>
<tr>
<td>Subjective Nutritional Knowledge Q3</td>
<td>0.82</td>
</tr>
<tr>
<td>Source Credibility Q1</td>
<td>0.90</td>
</tr>
<tr>
<td>Source Credibility Q2</td>
<td>0.92</td>
</tr>
<tr>
<td><strong>Eigenvalue</strong></td>
<td><strong>5.19 3.99 2.46 2.22 1.72</strong></td>
</tr>
<tr>
<td><strong>Percent of Total Variance</strong></td>
<td><strong>27.30 20.97 12.94 11.69 9.08</strong></td>
</tr>
<tr>
<td><strong>Cumulative Percent of Total Variance</strong></td>
<td><strong>27.30 48.27 61.22 72.92 81.99</strong></td>
</tr>
</tbody>
</table>

Note: a. Reverse Code

Table 4.3: Results of Exploratory Factor Analysis

For testing the internal consistency of items, the reliability analysis was conducted utilizing Cronbach’s alpha. For all continuous variables, the reliability analysis was implemented using the total sample. The values of Cronbach’s alpha for all measures ranged from 0.82 to 0.96, which indicated an acceptable level of reliability, $\alpha=0.70$, for
all measures. Thus, it was concluded that the instruments utilized for this study had internally consistent reliability in measuring the defined variables. Table 4.4 displays the values of Cronbach’s alpha for each instrument used in this study.

<table>
<thead>
<tr>
<th>Measures</th>
<th>No. of Items</th>
<th>Cronbach’s Alpha (α)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutritional Perception</td>
<td>3</td>
<td>0.88</td>
</tr>
<tr>
<td>Source Credibility</td>
<td>2</td>
<td>0.82</td>
</tr>
<tr>
<td>Overall Attitude toward an item</td>
<td>3</td>
<td>0.92</td>
</tr>
<tr>
<td>Purchase Intention</td>
<td>3</td>
<td>0.96</td>
</tr>
<tr>
<td>Motivation to Process Nutritional Information</td>
<td>5</td>
<td>0.92</td>
</tr>
<tr>
<td>Subjective Nutritional Knowledge</td>
<td>3</td>
<td>0.86</td>
</tr>
</tbody>
</table>

Table 4.4: Results of Reliability Analysis

4.3 Manipulation Check of Menu Items

Prior to hypothesis testing, the manipulation check was completed to ensure that the six menu items were placed in their proper nutritional menu contexts – healthy or unhealthy – when nutritional information was not provided. For this manipulation check, analysis of variance (ANOVA) was conducted using the respondents’ assessed values of nutritional perception without nutritional information. The results of ANOVA showed that there were significant differences between the perceived nutritional levels of the six menu items (F=26.89, df=(5, 357), p≤0.001). Specifically, according to the tukey post hoc test, the perceived nutritional levels of the Chicken Fajitas (mean=2.64 out of 5), Chicken Caesar Salad (mean=3.00), and Chicken Marsala (mean=3.06) significantly
differed from the perceived nutritional levels of the Italian Chicken Sandwich (mean=3.43), Lemon Herb Roasted Chicken (mean=3.67), and Grilled Chicken (mean=4.09). Among the six menu items, the Grilled Chicken was perceived as the healthiest item, while the Chicken Fajitas was perceived as the least healthy item. The average perceived nutrition levels of the menu items when nutritional information was not provided are presented in Table 4.5.

<table>
<thead>
<tr>
<th>Healthy Item</th>
<th>Mean (St.dev.)</th>
<th>Unhealthy Item</th>
<th>Mean (St.dev.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Italian Chicken Sandwich</td>
<td>3.43 (0.68) b</td>
<td>Chicken Caesar Salad</td>
<td>3.00 (0.62) c</td>
</tr>
<tr>
<td>Lemon Herb Roasted Chicken</td>
<td>3.67 (0.73) b</td>
<td>Chicken Fajitas</td>
<td>2.64 (0.84) c,d</td>
</tr>
<tr>
<td>Grilled Chicken</td>
<td>4.09 (0.78) a</td>
<td>Chicken Marsala</td>
<td>3.06 (0.76) d</td>
</tr>
</tbody>
</table>

\[ F=26.9 \text{ (d.f.=5, 357), } p\leq0.001 \]

Note: a, b, c, and d are significantly different at the level of 0.05.

Table 4.5: Mean Values of Nutritional Perception of the Menu Items without Nutritional Information

Regarding the choice of a menu item, respondents most often selected the Chicken Fajitas (n=61, 24.4%) or the Lemon Herb Roasted Chicken (n=54, 21.6%); this result confirms that popular items were selected as the healthy and unhealthy target items. Thus, the six menu items were correctly manipulated for this study since the healthy target item was the Lemon Herb Roasted Chicken, and the unhealthy target item was the Chicken Fajitas. For the healthy menu context, the Italian Chicken Sandwich and the Grilled Chicken were placed on the menu; the Chicken Caesar Salad and the Chicken Marsala were provided as unhealthy options in the unhealthy menu context.
The accuracy of the provided nutritional information was assessed using two questions. For the six menu items, the mean values of source credibility ranged from 3.33 (Chicken Caesar Salad) to 3.95 (Grilled Chicken) out of a possible 5 points. The scale was defined as 1=very inaccurate to 5=very accurate. There were significant differences in the source credibility scores, depending on the menu item at hand (F=10.17, df=(5, 946), p<0.01). The tukey post hoc test revealed that the mean value of the source credibility score for the Grilled Chicken significantly differed from the mean values for the other five items. This implies that consumers were more likely to trust the nutritional information that was provided for the Grilled Chicken than they were to trust the information provided for the other items; this may be because the Grilled Chicken had the healthiest nutritional values among the items. However, source credibility scores did not significantly differ with the level of nutritional information for any of the six menu items.

4.4 Hypotheses Test

The proposed hypotheses were tested using multiple regression analysis. Focusing on the target items, multiple regression analyses were conducted separately for each of three dependent variables: nutritional perception, overall attitude toward the menu item, and purchase intention for the target item. To begin, the assumptions necessary for multiple regression analysis were checked. There are four required assumptions in multiple regression analysis, and tests were conducted to check each assumption: the normality test, the test of independence of error terms, the check of consistent error variance, and the test for linearity of the regression function (Neter, Kutner, Nachtsheim, & Wasserman, 1996). For all estimated regression models, there
were no violations of either the linearity assumption or the normality assumption; these were checked using the residual plot and the normal probability plot, respectively. The scatter plots of residuals versus the order of respondents showed that the error terms were independent of the order in which the data were collected for all models. Plots of residuals versus the fitted values did not show any particular patterns for any of the estimated models, indicating that the error variances were consistent.

Several demographic variables were included in all regression models as control variables: age, gender, and Body Mass Index (BMI), and income. However, no demographic variables were significant in the model, they were therefore excluded.

4.4.1 The Influence of Providing Nutritional Information on the Menu

Multiple regression analysis was used to test the effect that nutritional information disclosure had on consumers’ food decision making process as measured by three dependent variables: nutritional perception, overall food attitude, and purchase intention. Two dichotomous variables for three different nutritional information levels were included in the model as independent variables, along with an additional independent variable which distinguished a healthy target item from an unhealthy item; thus, the effect of the nutritional level of target items could be controlled. The following regression model was developed:

\[
DV_i = \beta_0 + \beta_1 \cdot TI + \beta_2 \cdot TC + \beta_3 \cdot NI + e
\]

where \(DV\) = Dependent Variable with \(i=1, 2, 3\);

\(DV = \) Nutritional Perception if \(i=1\); \(DV = \) Overall Food Attitude if \(i=2\);

\(DV = \) Purchase Intention if \(i=3\)
TI = Target Item with 1 = healthy target item or 0 = unhealthy target item

TC = Total Calories only Information with 1 = provided or 0 = not provided

NI = Nutritional Information of 6 contents with 1 = provided or 0 = not provided

$e$ = error term

The results showed significant evidence that the presence of nutritional information on the menu negatively influenced consumers’ food decision making when the health of the target item was controlled for. The model fit for each of the three equations was deemed significant at the 0.05 level by F-tests (Nutritional Perception: $F=36.93$, d.f.$=(3, 315)$, $p<0.001$; Overall food attitude: $F=3.83$, d.f.$=(3, 315)$, $p<0.01$; Purchase Intention: $F=3.41$, d.f.$=(3, 315)$, $p<0.05$). Additionally, the presence of nutritional information when the health of the target item variable was included explained 25% of variance of nutritional perception, but accounted for only 3% and 2% of variance of overall food attitude and purchase intention, respectively. Therefore, the level of healthiness of menu items and nutritional information disclosure were more associated with perceived nutrition of the menu item than they were with overall food attitude or purchase intention.

Nutritional perception of the menu item decreased by 0.20 units when nutritional information for the 6 nutrient contents was provided (Nutritional Perception: $b_3=-0.20$, S.E.$=0.12$). The presence of total calories information was also negatively associated with customers’ nutritional perception, but the relationship was not significant. In the models explaining overall attitude towards a menu item and purchase intention, nutritional information levels, total calories only and nutritional information for the 6 nutrient contents, had significant negative effects (Overall food attitude: $b_2=-0.32$
This result implies that consumers negatively evaluated a menu item and became less likely to purchase a menu item when nutritional information was provided on the menu. This result supports hypothesis 1, which explained the influence of nutritional information disclosure on consumer food decision making.

Additionally, a healthy target item was perceived as much healthier than an unhealthy item \(b_1=0.99, \text{S.E}=0.09\). However, there was no significant difference between healthy and unhealthy target items in terms of either overall food evaluation or purchase intention. Thus, overall attitude and purchase intention were not influenced by the healthiness of the menu item. Table 4.6 outlines the results of the multiple regression analyses.

Table 4.6: Results of Regression Analysis: Effect of Nutritional Information Disclosure

<table>
<thead>
<tr>
<th></th>
<th>Dependent Variables</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nutritional Perception</td>
<td>Food Attitude</td>
<td>Purchase Intention</td>
</tr>
<tr>
<td>Independent Variables</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
</tr>
<tr>
<td>Constant</td>
<td>2.66 (0.09)***</td>
<td>3.95 (0.11)***</td>
<td>3.89 (0.13)***</td>
</tr>
<tr>
<td>Target Item</td>
<td>0.99 (0.09)***</td>
<td>0.12 (0.11)</td>
<td>0.05 (0.13)</td>
</tr>
<tr>
<td>Total Calories Info</td>
<td>-0.06 (0.12)</td>
<td>-0.32 (0.14)**</td>
<td>-0.38 (0.16)**</td>
</tr>
<tr>
<td>Nutritional Info of 6 contents</td>
<td>-0.20 (0.12)*</td>
<td>-0.44 (0.14)***</td>
<td>-0.49 (0.16)***</td>
</tr>
<tr>
<td>Adj. $R^2$</td>
<td>0.25</td>
<td>0.03</td>
<td>0.02</td>
</tr>
<tr>
<td>Model fit (F-Value)</td>
<td>36.93***</td>
<td>3.83***</td>
<td>3.41**</td>
</tr>
</tbody>
</table>

Note: *Significant at $p<0.1$; **Significant at $p<0.05$; ***Significant at $p<0.01$.

Standard errors are in the parentheses.
Based on the results of multiple regression analysis, the following predicted models were obtained, which allowed the predicted values of the three dependent variables for each menu item to be calculated. Table 4.7 and Figure 4.1 display the predicted values of the three dependent variables.

Predicted Nutritional Perception = 2.66 + 0.99TI – 0.06TC – 0.20NI

Predicted Overall Food Attitude = 3.95 + 0.12TI – 0.32TC – 0.20 NI

Predicted Purchase Intention = 3.89 + 0.05TI – 0.38TC – 0.49NI

<table>
<thead>
<tr>
<th></th>
<th>Healthy Target Item</th>
<th>Unhealthy Target Item</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
<td>Total Calories</td>
</tr>
<tr>
<td>Nutritional Perception</td>
<td>3.65</td>
<td>3.59</td>
</tr>
<tr>
<td>Overall Food Attitude</td>
<td>4.07</td>
<td>3.75</td>
</tr>
<tr>
<td>Purchase Intention</td>
<td>3.94</td>
<td>3.56</td>
</tr>
</tbody>
</table>

Table 4.7: Predicted Values of Dependent Variables depending on Nutritional Information
4.4.2 The Influence of Nutritional Menu Context

To test the main and moderating effects of nutritional menu context, multiple regression analysis with two stages was implemented. In the first stage of analysis, a model which included three independent variables was estimated. The three independent variables included the indicator variables representing the three nutritional information levels and the variable representing nutritional menu context. In the second stage, two interaction terms were added to the model; the interaction variables were meant to capture the interactions between the nutritional context and the nutritional information levels. The interaction terms were calculated by determining the product of the nutritional menu context variable and each of the two indicator variables representing the three levels of nutritional information. The dummy variable which identified the target item was also retained in the model as a control variable. Thus, the full regression model was specified as follows:
$DV_i = \beta_0 + \beta_1 \cdot TI + \beta_2 \cdot TC + \beta_3 \cdot NI + \beta_4 \cdot NC + \beta_5 (TC \times NC) + \beta_6 (NI \times NC) + e$

where $DV$=Dependent Variable with $i=1, 2, 3$; $DV=$ Nutritional Perception if $i=1$; $DV=$ Overall Food Attitude if $i=2$; $DV=$Purchase Intention if $i=3$

TI = Target Item with $1 =$ healthy target item or $0 =$ unhealthy target item

TC = Total Calories only Information with $1 =$ provided or $0 =$ not provided

NI = Nutritional Information of 6 contents with $1 =$ provided or $0 =$ not provided

NC = Nutritional Context with $1 =$ healthy context or $0 =$ unhealthy context

$TC \times NC =$ Interaction term between TC and NC

$NI \times NC =$ Interaction term between NI and NC

e = error term

**Main Effect of Nutritional Menu Context**

In the first stage of analysis, the models for all three dependent variables were significant at the 0.01 level (Nutritional Perception: $F=48.77$, d.f.=(4, 314), $p<0.001$; Overall food attitude: $F=7.11$, d.f.=(4, 314), $p<0.001$; Purchase Intention: $F=7.50$, d.f.=(4, 314), $p<0.001$). The nutritional information level and the nutritional menu context explained 37% of total variation in consumers’ nutritional perception, and explained 7% and 8% of the variation in overall food attitude and purchase intention, respectively.

The effect of nutritional menu context on all three dependent variables was significant at the 0.01 level. When other variables were held constant, consumers perceived an item to be 0.69 units less nutritious in the healthy context than they did in the unhealthy context ($b_4=-0.69$, S.E. = 0.09). At the same time, consumers’ overall attitude toward an item and likelihood of purchasing an item decreased by 0.46 and 0.57
units, respectively, when an item was placed with healthy items on the menu (Overall food attitude: \(b_4=-0.46, \text{S.E.}=0.11\); Purchase intention: \(b_4=-0.57, \text{S.E.}=0.13\)). Therefore, the proposed hypothesis 2, that “the nutritional menu context will significantly influence consumers’ food decision making, especially consumers’ nutritional perception, overall food evaluation, and purchase intention,” was supported by this result.

Additionally, the nutritional level of the target item had a significant effect on nutritional perception. Consumers’ perceived nutritional level for a healthy item significantly differed by 0.98 units from their perceived nutritional level of an unhealthy item. The significant effect of presented nutritional information was maintained after adding the nutritional menu context variable.

**Moderating Effect of Nutritional Menu Context**

When the interactions were included in the second stage of analysis, the adjusted \(R^2\) values significantly increased by 2% for the nutritional perception model and by 3% for both the overall food attitude and purchase intention models. In addition, for all three dependent variables, the changes in F-value due to the addition of the interaction terms were significant at the 0.01 level.

When the level of nutritional information was interacted with the menu context, the variable had a significant effect on all three of the dependent variables (Nutritional perception; \(b_5=-0.55, \text{S.E.}=0.21\), \(b_6=-0.67, \text{S.E.}=0.21\); Overall food attitude: \(b_5=-0.79, \text{S.E.}=0.27\), \(b_6=-0.75, \text{S.E.}=0.27\); Purchase intention: \(b_5=-0.99, \text{S.E.}=0.31\), \(b_6=-0.72, \text{S.E.}=0.31\)). This indicates that consumers’ nutritional perception of a menu item when the item was placed in the healthy context decreased by 0.55 units when they were
exposed to total calories information and by 0.67 units when they were exposed to nutritional information for the 6 nutrient contents, when compared to the no nutritional information treatment. Similarly, overall attitude toward a menu item when the item was placed in the healthy context was 0.79 units less when total calories were disclosed and 0.75 units less when the nutritional information of the 6 nutrient contents was disclosed than when no nutritional information was provided. In addition, consumers were less likely to purchase an item placed in the healthy context when total calories only or nutritional information for the 6 nutrient contents was offered than when no information was provided. Thus, hypothesis 3, that “the nutritional menu context will significantly moderate the effect of the presence of nutritional information on consumers’ nutritional perception, overall food evaluation, and purchase intention,” was supported.

With inclusion of the interaction terms, the main effect of nutritional information disclosure was eliminated for all three dependent variables, but the main effect of the nutritional context remained significant in only the nutritional perception model.

The results of these multiple regression analyses can be found in Table 4.8; the interaction effects between the nutritional information levels and the nutritional context on the three dependent variables are depicted in Figures 4.2, 4.3, and 4.4.
### Table 4.8: Results of Regression Analysis: Effect of Nutritional Menu Context

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Model I</th>
<th></th>
<th></th>
<th>Model II</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nutritional Perception</td>
<td>Attitude toward food</td>
<td>Purchase Intention</td>
<td>Nutritional Perception</td>
<td>Attitude toward food</td>
<td>Purchase Intention</td>
</tr>
<tr>
<td></td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
</tr>
<tr>
<td>Constant</td>
<td>3.02 (0.10)**</td>
<td>4.18 (0.13)**</td>
<td>4.18 (0.15)**</td>
<td>2.81 (0.11)**</td>
<td>3.92 (0.15)**</td>
<td>3.89 (0.17)**</td>
</tr>
<tr>
<td>Target Item</td>
<td>0.98 (0.09)**</td>
<td>0.12 (0.11)</td>
<td>0.04 (0.13)</td>
<td>0.99 (0.08)**</td>
<td>0.12 (0.11)</td>
<td>0.04 (0.13)</td>
</tr>
<tr>
<td>Total Calories</td>
<td>-0.06 (0.11)</td>
<td>-0.32 (0.14)**</td>
<td>-0.39 (0.16)**</td>
<td>0.21 (0.15)</td>
<td>0.07 (0.19)</td>
<td>0.11 (0.22)</td>
</tr>
<tr>
<td>Nutritional Info of 6 contents</td>
<td>-0.21 (0.11)**</td>
<td>-0.44 (0.14)**</td>
<td>-0.50 (0.16)**</td>
<td>0.12 (0.15)</td>
<td>-0.07 (0.19)</td>
<td>-0.14 (0.22)</td>
</tr>
<tr>
<td>Context</td>
<td>-0.69 (0.09)**</td>
<td>-0.46 (0.11)**</td>
<td>-0.57 (0.13)**</td>
<td>-0.29 (0.15)**</td>
<td>0.06 (0.19)</td>
<td>0.002 (0.22)</td>
</tr>
<tr>
<td>Cal*Context</td>
<td>-0.55 (0.21)**</td>
<td>-0.79 (0.27)**</td>
<td>-0.99 (0.31)**</td>
<td>-0.79 (0.27)**</td>
<td>-0.99 (0.31)**</td>
<td>-0.99 (0.31)**</td>
</tr>
<tr>
<td>NI*Context</td>
<td>-0.67 (0.21)**</td>
<td>-0.75 (0.27)**</td>
<td>-0.72 (0.31)**</td>
<td>-0.75 (0.27)**</td>
<td>-0.72 (0.31)**</td>
<td>-0.72 (0.31)**</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.37</td>
<td>0.07</td>
<td>0.07</td>
<td>0.39</td>
<td>0.10</td>
<td>0.10</td>
</tr>
<tr>
<td>Model fit (F-Value)</td>
<td>48.77***</td>
<td>7.11***</td>
<td>7.50***</td>
<td>35.42***</td>
<td>6.67***</td>
<td>6.93***</td>
</tr>
<tr>
<td>R² Change</td>
<td>0.02***</td>
<td>0.03***</td>
<td>0.03***</td>
<td>0.02***</td>
<td>0.03***</td>
<td>0.03***</td>
</tr>
<tr>
<td>F Change</td>
<td>5.75***</td>
<td>5.39***</td>
<td>5.38***</td>
<td>5.75***</td>
<td>5.39***</td>
<td>5.38***</td>
</tr>
</tbody>
</table>

Note: *Significant at p<0.1; **Significant at p<0.05; ***Significant at p<0.01. Standard errors are in the parentheses.
Figure 4.2: Interaction Effect between the Presence of Nutritional Information and the Nutritional Menu Context on Nutritional Perception

Figure 4.3: Interaction Effect between the Presence of Nutritional Information and the Nutritional Menu Context on Overall Food Attitude
Based on the estimated models for the three dependent variables, predicted values were obtained and are displayed in Table 4.9. Without nutritional information, consumers’ perceived nutritional level for a healthy item was expected to be 3.31 out of 5 points in the healthy context and 4.00 out of 5 points in the unhealthy context. On the other hand, consumers’ nutritional perception of an unhealthy item was expected to be 2.33 in the healthy context and 3.02 in the unhealthy context.
4.4.3 The Role of Motivation to Process Nutritional Information

In order to test the moderating effect of motivation to process nutritional information (MOT), multiple regression analysis with two stages was conducted. In the first stage of analysis, two indicator variables for the three nutritional information levels and a continuous variable for the motivation to process nutritional information were included as independent variables in the model. In the second stage, two interaction terms between the motivation to process information and each of the nutritional information levels expressed by the two indicator variables were added to the model.

---

### Table 4.9: Predicted Values of Dependent Variables without Interaction Terms b/w the Nutritional Menu Context and the Nutritional Information Level

<table>
<thead>
<tr>
<th></th>
<th>Healthy Item</th>
<th>Unhealthy Item</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Healthy Context</td>
<td>Unhealthy Context</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>Total Calories</td>
</tr>
<tr>
<td>Nutritional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perception</td>
<td>3.31</td>
<td>3.25</td>
</tr>
<tr>
<td>Attitude toward food</td>
<td>3.84</td>
<td>3.52</td>
</tr>
<tr>
<td>Purchase Intention</td>
<td>3.65</td>
<td>3.26</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Healthy Item</th>
<th>Unhealthy Item</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control</td>
<td>Total Calories</td>
</tr>
<tr>
<td>Nutritional</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perception</td>
<td>2.33</td>
<td>2.27</td>
</tr>
<tr>
<td>Attitude toward food</td>
<td>3.72</td>
<td>3.40</td>
</tr>
<tr>
<td>Purchase Intention</td>
<td>3.61</td>
<td>3.22</td>
</tr>
</tbody>
</table>

Table 4.9: Predicted Values of Dependent Variables without Interaction Terms b/w the Nutritional Menu Context and the Nutritional Information Level
Due to a multi-collinearity problem among independent variables, a centered variable for motivation to process information was added to the model. The centered variable was calculated by subtracting the mean value (mean=3.22) from the original value of motivation to process. Then, the interaction terms were obtained by multiplying the centered motivation value and the indicator variables of nutritional information levels. The effects of the healthiness of the target item and the nutritional context were also kept in the model. The following regression model was used to test the moderating effect of motivation to process nutritional information.

$$DV_i = \beta_0 + \beta_1 \cdot TI + \beta_2 \cdot NC + \beta_3 \cdot TC + \beta_4 \cdot NI + \beta_5 \cdot CMOT + \beta_6 (TC \times CMOT) + \beta_7 (NI \times CMOT) + e$$

where $DV$=Dependent Variable with $i=1, 2, 3$

$DV$= Nutritional Perception if $i=1$; $DV$= Overall Food Attitude if $i=2$,

$DV$=Purchase Intention if $i=3$

$TI$ = Target Item with 1 = healthy target item or 0 = unhealthy target item

$NC$ = Nutritional Context with 1 = healthy context or 0 = unhealthy context

$TC$ = Total Calories only Information with 1 = provided or 0 = not provided

$NI$ = Nutritional Information of 6 contents with 1 = provided or 0 = not provided

$CMOT$ = Centered Motivation to Process nutritional information with mean=0

$TC \times CMOT$ = Interaction term between TC and CMOT

$NI \times CMOT$ = Interaction term between NI and CMOT

$e$ = error term

When interaction terms were not included, the suggested regression model was significant at the 0.01 level for all three of the dependent variables (Nutritional
Perception: F=38.94, d.f.=(5, 313), p<0.001; Overall food attitude: F=5.68, d.f.=(5, 313), p<0.001; Purchase Intention: F=5.98, d.f.=(5, 313), p<0.001. Thirty-seven percent of total variance in consumers’ nutritional perception was explained by the independent variables with two control variables. The variables also accounted for 7% of total variance of both overall food attitude and purchase intention.

There was no significant main effect of consumers’ motivation to process nutritional information when other variables were held constant. But, the main effects of both nutritional context and the presence of nutritional information were still significant for all three dependent variables.

After adding variables capturing the interaction between nutritional information levels and the motivation to process to the nutritional perception model, adjusted R$^2$ increased by 2 percentage points. Also, after including the interaction terms, the F-value change was only significant in the nutritional perception model (F=4.11, df=(2, 311), p<0.05). The changes in adjusted R$^2$ were not significant in the using overall food attitude model or in the purchase intention model.

There was, however, a significant effect of the interaction between the nutritional information levels and the motivation to process nutritional information on nutritional perception and overall food attitude. In particular, the interaction between the presence of nutritional information for the 6 nutrient contents and motivation to process was found to be significant in the nutritional perception model (b$_7$=-0.18, S.E.=0.09). This indicates that consumers’ perceived nutritional level of a menu item decreased by 0.18 units as their motivation to process increased by one unit, only if nutritional information for the 6 nutrient contents was offered. In contrast, as motivation to process increased, consumers
had more favorable food attitudes for menu items only when total calorie information was provided \((b_6=0.23, S.E.=0.13)\). Thus, overall food attitude increased by 0.23 units when consumers’ motivation to process increased by 1 unit, only when total calorie information was disclosed. This result partially supports hypothesis 4 that predicted that motivation to process would have a significant moderating effect on consumer food decision making. Table 4.10 displays the results of this multiple regression analysis.

Figure 4.5 and Figure 4.6 show the interaction plots that represent the significant interaction effects on nutritional perception and overall food attitude. For the interaction plots of nutritional information levels with motivation to process, the three different levels of motivation to process were calculated by adding and subtracting two times the standard deviation from zero, which was the mean of the centered motivation to process variable \((S.D.=1.14)\). The interaction plots show that consumers with high motivation to process perceived the nutritional level of a menu item differently than do those with low or medium levels of motivation to process. The negative association between the high motivation to process and the nutritional information level is clear (See Figure 4.5). In terms of overall attitude toward a menu item, consumers with moderate levels of motivation to process had more favorable attitudes toward a menu item when nutritional information was provided. However, consumers who had low or high motivation levels showed a more negative attitude toward menu items when nutritional information was present (See Figure 4.6).
<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Nutritional Perception</th>
<th>Attitude toward food</th>
<th>Purchase Intention</th>
<th>Nutritional Perception</th>
<th>Attitude toward food</th>
<th>Purchase Intention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
</tr>
<tr>
<td>Constant</td>
<td>3.02 (0.10)***</td>
<td>4.18 (0.13)***</td>
<td>4.18 (0.15)***</td>
<td>3.02 (0.10)***</td>
<td>4.17 (0.13)***</td>
<td>4.19 (0.15)***</td>
</tr>
<tr>
<td>Target Item</td>
<td>0.98 (0.09)***</td>
<td>0.12 (0.11)</td>
<td>0.04 (0.13)</td>
<td>0.99 (0.09)***</td>
<td>0.13 (0.11)</td>
<td>0.05 (0.13)</td>
</tr>
<tr>
<td>Context</td>
<td>-0.69 (0.09)***</td>
<td>-0.46 (0.11)***</td>
<td>-0.57 (0.13)***</td>
<td>-0.68 (0.09)***</td>
<td>-0.46 (0.11)***</td>
<td>-0.57 (0.13)***</td>
</tr>
<tr>
<td>Total Calories</td>
<td>-0.07 (0.11)</td>
<td>-0.32 (0.14)**</td>
<td>-0.39 (0.16)**</td>
<td>-0.09 (0.11)</td>
<td>-0.32 (0.14)**</td>
<td>-0.39 (0.16)**</td>
</tr>
<tr>
<td>Nutritional Info of 6 contents</td>
<td>-0.22 (0.11)**</td>
<td>-0.44 (0.14)***</td>
<td>-0.50 (0.16)***</td>
<td>-0.22 (0.11)**</td>
<td>-0.43 (0.14)***</td>
<td>-0.49 (0.16)***</td>
</tr>
<tr>
<td>Motivation (CMOT)</td>
<td>0.01 (0.04)</td>
<td>-0.009 (0.05)</td>
<td>0.000 (0.06)</td>
<td>0.06 (0.07)</td>
<td>-0.08 (0.09)</td>
<td>-0.02 (0.10)</td>
</tr>
<tr>
<td>Cal*CMOT</td>
<td></td>
<td>0.07 (0.10)</td>
<td>0.23 (0.13)*</td>
<td>0.15 (0.15)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NI*CMOT</td>
<td></td>
<td></td>
<td></td>
<td>-0.18 (0.09)**</td>
<td>0.02 (0.12)</td>
<td>-0.07 (0.14)</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.37</td>
<td>0.07</td>
<td>0.07</td>
<td>0.39</td>
<td>0.08</td>
<td>0.07</td>
</tr>
<tr>
<td>Model fit (F-Value)</td>
<td>38.94***</td>
<td>5.68***</td>
<td>5.98***</td>
<td>29.54***</td>
<td>4.69***</td>
<td>4.65***</td>
</tr>
<tr>
<td>R² Change</td>
<td>0.02**</td>
<td>0.01</td>
<td>0.008</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F Change</td>
<td>4.11**</td>
<td>2.13</td>
<td>1.29</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: *Significant at p<0.1; **Significant at p<0.05; ***Significant at p<0.01.
Standard errors are in the parentheses.

Table 4.10: Results of Regression Analysis: Effect of Motivation to Process Nutritional Information
Figure 4.5: Interaction Effect between the Presence of Nutritional Information and the Motivation to Process on Nutritional Perception

Figure 4.6: Interaction Effect between the Presence of Nutritional Information and the Motivation to Process on Overall Food Attitude
4.4.4 The Role of Nutritional Knowledge

The moderating effect of nutritional knowledge was analyzed using multiple regression analysis. Again, two stages of analyses were completed. Like in the previous model, two indicator variables representing the three nutritional information levels and a continuous variable for nutritional knowledge were included in the first stage model as independent variables. Nutritional knowledge was measured using two different instruments: objective nutritional knowledge was measured using fifteen multiple choice questions and subjective nutritional knowledge was measured using a five-point Likert-scale. Thus, two different models – one for objective nutritional knowledge and one for subjective nutritional knowledge – were developed.

\[ DV_i = \beta_0 + \beta_1 \cdot TI + \beta_2 \cdot NC + \beta_3 \cdot TC + \beta_4 \cdot NI + \beta_5 \cdot CONK + \beta_6 (TC \times CONK) + \beta_7 (NI \times CONK) + e \]

\[ DV_i = \beta_0 + \beta_1 \cdot TI + \beta_2 \cdot NC + \beta_3 \cdot TC + \beta_4 \cdot NI + \beta_5 \cdot CSNK + \beta_6 (TC \times CSNK) + \beta_7 (NI \times CSNK) + e \]

where DV=Dependent Variable with i=1, 2, 3

DV= Nutritional Perception if i=1; DV= Overall Food Attitude if i=2,
DV=Purchase Intention if i=3
TI = Target Item with 1 = healthy target item or 0 = unhealthy target item
NC = Nutritional Context with 1 = healthy context or 0 = unhealthy context
TC = Total Calories only Information with 1 = provided or 0 = not provided
NI = Nutritional Information of 6 contents with 1 = provided or 0 = not provided
CONK = Centered Objective Nutritional Knowledge with mean=0
TC×CONK = Interaction term between TC and CONK
NI×CONK = Interaction term between NI and CONK
CSNK = Centered Subjective Nutritional Knowledge with mean=0
TC×CSNK = Interaction term between TC and CSNK
NI×CSNK = Interaction term between NI and CSNK

e = error term

In the second stage, the model included interaction terms between objective nutritional knowledge and each of the two nutritional information level variables, as well as between subjective nutritional knowledge and each of the two nutritional information level variables. The interaction terms were obtained by calculating the product of the nutritional information indicator variable and the knowledge score, for both the subjective and objective knowledge scores. The interaction terms again created multicollinearity problems in the models, so the centered objective and subjective nutritional knowledge variables were used instead of the original values of the nutritional knowledge variables. The centered objective and subjective nutritional knowledge values were calculated as the differences between the original values and the mean values (mean of objective nutritional knowledge=8.17 out of 15; mean of subjective nutritional knowledge=3.20 out of 5). Using the centered variables, the interaction terms were recalculated and included in the model. The effects of the target item and the nutritional context were controlled for in all models.

The Effect of Objective Nutritional Knowledge

For the models which included the objective nutritional knowledge variable, the model fits for each of the three dependent variables were significant at the 0.01 level
(Nutritional Perception: $F=38.90$, d.f.=(5, 313), $p<0.001$; Overall food attitude: $F=5.71$, d.f.=(5, 313), $p<0.001$; Purchase Intention: $F=6.02$, d.f.=(5, 313), $p<0.001$). Nutritional information levels and objective nutritional knowledge accounted for 37% of total variance in consumers’ nutritional perception. This value increased by 2 percentage points when the interaction terms were included. The independent variables alone explained only 7% of total variance of both overall food attitude and purchase intention. However, for these two independent variables, inclusion of the interaction terms between nutritional information levels and objective nutritional knowledge did not significantly increase the explained variation. Including interaction terms did not significantly change F-values for any of the three dependent variables (See Table 4.11).

The results of multiple regression revealed that objective nutritional knowledge did not carry a significant main effect when other variables were kept constant. Additionally, a significant interaction effect between the presence of nutritional information and objective nutritional knowledge was not found for any of the three dependent variables: nutritional perception, overall food attitude, and purchase intention. However, the other independent variables such as the nutritional context and the presence of nutritional information did influence the three dependent variables. This implies that consumers’ objective nutritional knowledge did not significantly moderate the effect of the presence of nutritional information. Table 4.11 outlines the result of multiple regression analysis.
<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Model I</th>
<th></th>
<th></th>
<th>Model II</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nutritional Perception</td>
<td>Attitude toward food</td>
<td>Purchase Intention</td>
<td>Nutritional Perception</td>
<td>Attitude toward food</td>
<td>Purchase Intention</td>
</tr>
<tr>
<td></td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
</tr>
<tr>
<td>Constant</td>
<td>3.02 (0.10)***</td>
<td>4.19 (0.13)***</td>
<td>4.19 (0.15)***</td>
<td>3.01 (0.10)***</td>
<td>4.19 (0.13)***</td>
<td>4.21 (0.15)***</td>
</tr>
<tr>
<td>Target Item</td>
<td>0.98 (0.09)***</td>
<td>0.12 (0.11)</td>
<td>0.04 (0.13)</td>
<td>0.99 (0.09)***</td>
<td>0.11 (0.11)</td>
<td>0.03 (0.13)</td>
</tr>
<tr>
<td>Context</td>
<td>-0.69 (0.09)***</td>
<td>-0.46 (0.11)***</td>
<td>-0.57 (0.13)***</td>
<td>-0.70 (0.09)***</td>
<td>-0.45 (0.11)***</td>
<td>-0.56 (0.13)***</td>
</tr>
<tr>
<td>Total Calories</td>
<td>-0.07 (0.11)</td>
<td>-0.33 (0.14)**</td>
<td>-0.40 (0.16)**</td>
<td>-0.06 (0.11)</td>
<td>-0.35 (0.14)**</td>
<td>-0.41 (0.16)**</td>
</tr>
<tr>
<td>Nutritional Info of 6 contents</td>
<td>-0.22 (0.11)**</td>
<td>-0.45 (0.14)***</td>
<td>-0.51 (0.16)***</td>
<td>-0.21 (0.11)*</td>
<td>-0.45 (0.14)***</td>
<td>-0.52 (0.16)***</td>
</tr>
<tr>
<td>Objective NK (CONK)</td>
<td>0.003 (0.01)</td>
<td>0.01 (0.02)</td>
<td>0.01 (0.03)</td>
<td>-0.02 (0.03)</td>
<td>0.02 (0.04)</td>
<td>0.05 (0.16)</td>
</tr>
<tr>
<td>Cal*CONK</td>
<td></td>
<td></td>
<td></td>
<td>0.05 (0.05)</td>
<td>0.01 (0.06)</td>
<td>-0.05 (0.07)</td>
</tr>
<tr>
<td>NI*CONK</td>
<td></td>
<td></td>
<td></td>
<td>0.04 (0.04)</td>
<td>-0.05 (0.06)</td>
<td>-0.07 (0.06)</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.37</td>
<td>0.07</td>
<td>0.07</td>
<td>0.37</td>
<td>0.07</td>
<td>0.07</td>
</tr>
<tr>
<td>Model fit (F-Value)</td>
<td>38.90***</td>
<td>5.71***</td>
<td>6.02***</td>
<td>27.86***</td>
<td>4.21***</td>
<td>4.45***</td>
</tr>
<tr>
<td>R² Change</td>
<td></td>
<td></td>
<td></td>
<td>0.002</td>
<td>0.003</td>
<td>0.003</td>
</tr>
<tr>
<td>F Change</td>
<td></td>
<td></td>
<td></td>
<td>0.55</td>
<td>0.49</td>
<td>0.57</td>
</tr>
</tbody>
</table>

Note: *Significant at p<0.1; **Significant at p<0.05; ***Significant at p<0.01.
Standard errors are in the parentheses.

Table 4.11: Results of Regression Analysis: Effect of Objective Nutritional Knowledge
The Effect of Subjective Nutritional Knowledge

In order to test the role of subjective nutritional knowledge as a moderator, multiple regression models containing two categorical variables for nutritional information levels and a centered subjective nutritional knowledge variable were estimated. The fit of all three models was significant at the 0.01 level (Nutritional Perception: F=38.89, d.f.=(5, 313), p<0.001; Overall food attitude: F=5.78, d.f.=(5, 313), p<0.001; Purchase Intention: F=6.21, d.f.=(5, 313), p<0.001). Thirty-seven percent of the total variation in nutritional perception scores was explained by the independent variables and control variables, while only 7% of the variation of both overall food attitude and purchase intention was explained by the independent variables and control variables. In the second stage, interaction terms between nutritional information levels and subjective nutritional knowledge were added, but they did not significantly increase the adjusted R². Also, the changes in F-value due to the addition of the interaction terms were not large enough to be significant for any of the three dependent variables: nutritional perception, overall food attitude, and purchase intention.

According to the results of multiple regression analysis, subjective nutritional knowledge did not carry a significant main effect for any of the three dependent variables (Nutritional perception: b=0.001, S.E.=0.05; Overall food attitude: b=-0.049, S.E. = 0.06; Purchase intention: b=0.07, S.E. = 0.07). Additionally, the interaction terms between nutritional information levels and subjective nutritional knowledge did not influence consumers’ food evaluation processes: specifically nutritional perception, overall food attitude, and purchase intention were unaffected by the interaction terms. However, similar to the results of the prior analyses, the nutritional context and the presence of
nutritional information were significantly associated with all three dependent variables. Consequently, the level of consumers’ subjective nutritional knowledge did not moderate the effect that nutritional information disclosure had on consumers’ food decision making process. Table 4.12 shows the results of the multiple regression analysis related to subjective nutritional knowledge.

Additionally, it was investigated whether a term meant to capture the interaction between objective and subjective nutritional knowledge would have any effect on the three dependent variables. After adding the interaction term to both the objective and subjective nutritional knowledge regression models, no significant interaction effect between objective and subjective nutritional knowledge on consumer food evaluation and purchase intention appeared. Further, a three-way interaction effect between both nutritional knowledge variables and nutritional information disclosure proved insignificant.

Consequently, neither objective nor subjective nutritional knowledge significantly moderated the effect of nutritional information disclosure on consumer food decision making, and thus hypothesis 5 that proposed that nutritional knowledge could act as a moderator in the effect of nutritional information disclosure was not supported in this study.
<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Model I</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nutritional Perception</td>
<td>Attitude toward food</td>
<td>Purchase Intention</td>
<td>Nutritional Perception</td>
<td>Attitude toward food</td>
<td>Purchase Intention</td>
</tr>
<tr>
<td></td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
</tr>
<tr>
<td>Constant</td>
<td>3.02 (0.10)**</td>
<td>4.19 (0.13)***</td>
<td>4.19 (0.15)***</td>
<td>3.02 (0.10)***</td>
<td>4.19 (0.13)***</td>
<td>4.20 (0.15)***</td>
</tr>
<tr>
<td>Target Item</td>
<td>0.98 (0.09)**</td>
<td>0.12 (0.11)</td>
<td>0.05 (0.13)</td>
<td>0.99 (0.09)**</td>
<td>0.12 (0.11)</td>
<td>0.05 (0.13)</td>
</tr>
<tr>
<td>Context</td>
<td>-0.69 (0.09)**</td>
<td>-0.46 (0.11)***</td>
<td>-0.58 (0.13)***</td>
<td>-0.70 (0.09)***</td>
<td>-0.47 (0.11)***</td>
<td>-0.58 (0.13)***</td>
</tr>
<tr>
<td>Total Calories</td>
<td>-0.06 (0.11)</td>
<td>-0.33 (0.14)**</td>
<td>-0.40 (0.16)**</td>
<td>-0.07 (0.11)</td>
<td>-0.34 (0.14)**</td>
<td>-0.41 (0.16)**</td>
</tr>
<tr>
<td>Nutritional Info of 6 contents</td>
<td>-0.21 (0.11)**</td>
<td>-0.45 (0.14)***</td>
<td>-0.51 (0.16)***</td>
<td>-0.21 (0.11)**</td>
<td>-0.45 (0.14)***</td>
<td>-0.51 (0.16)***</td>
</tr>
<tr>
<td>Subjective NK (CSNK)</td>
<td>0.001 (0.05)</td>
<td>0.04 (0.06)</td>
<td>0.07 (0.07)</td>
<td>-0.02 (0.08)</td>
<td>0.06 (0.11)</td>
<td>0.09 (0.12)</td>
</tr>
<tr>
<td>Cal*CSNK</td>
<td>0.12 (0.12)</td>
<td>0.09 (0.15)</td>
<td>0.07 (0.18)</td>
<td>0.12 (0.12)</td>
<td>0.09 (0.15)</td>
<td>0.07 (0.18)</td>
</tr>
<tr>
<td>NI*CSNK</td>
<td>-0.05 (0.12)</td>
<td>-0.13 (0.15)</td>
<td>-0.11 (0.17)</td>
<td>-0.05 (0.12)</td>
<td>-0.13 (0.15)</td>
<td>-0.11 (0.17)</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.37</td>
<td>0.07</td>
<td>0.07</td>
<td>0.37</td>
<td>0.07</td>
<td>0.07</td>
</tr>
<tr>
<td>Model fit (F-Value)</td>
<td>38.89***</td>
<td>5.78***</td>
<td>6.01***</td>
<td>28.08***</td>
<td>4.44***</td>
<td>4.59***</td>
</tr>
<tr>
<td>R² Change</td>
<td>0.004</td>
<td>0.006</td>
<td>0.003</td>
<td>0.004</td>
<td>0.006</td>
<td>0.003</td>
</tr>
<tr>
<td>F Change</td>
<td>1.03</td>
<td>1.09</td>
<td>0.58</td>
<td>1.03</td>
<td>1.09</td>
<td>0.58</td>
</tr>
</tbody>
</table>

Note: *Significant at p<0.1; **Significant at p<0.05; ***Significant at p<0.01. Standard errors are in the parentheses.

Table 4.12: Results of Regression Analysis: Effect of Subjective Nutritional Knowledge
Based on the results of multiple regression analysis, the results of the hypothesis tests are summarized in Table 4.13.

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1. The presence of nutritional information on the menu will significantly influence consumer food decision making, especially consumers’ nutritional perception, overall food evaluation, and purchase intention.</td>
<td>Supported</td>
</tr>
<tr>
<td>H2. The nutritional menu context will significantly influence consumers’ food decision making, especially consumers’ nutritional perception, overall food evaluation, and purchase intention.</td>
<td>Supported</td>
</tr>
<tr>
<td>H3. The nutritional menu context will significantly moderate the effect of the presence of nutritional information on consumers’ nutritional perception, overall food evaluation, and purchase intention.</td>
<td>Supported</td>
</tr>
<tr>
<td>H4. The motivation to process nutritional information will significantly moderate the effect of the presence of nutritional information on consumers’ nutritional perception, overall food evaluation, and purchase intention.</td>
<td>Partially Supported</td>
</tr>
<tr>
<td>H5. The nutritional knowledge will significantly moderate the effect of the presence of nutritional information on consumers’ nutritional perception, overall food evaluation, and purchase intention.</td>
<td>Not Supported</td>
</tr>
</tbody>
</table>

Table 4.13: Results of Hypotheses Testing

4.5 Additional Analysis: Logistic Regression Analysis

Although a hypothesis about the actual choice of a menu item was not pre-specified, additional analysis was conducted to investigate what factors may be relevant predictors of item choice. Respondents were asked to select one item among the three
provided items on the menu; their choice was recorded as an indicator variable, which equaled 1 if the target item was selected and equaled 0 otherwise. This variable acted as the dependent variable in a logistic regression analysis, an analysis method used to find the relationship between explanatory variables and a binary dependent variable.

All variables related to the presence of nutritional information were included in the first logistic regression model; nutritional level of the target item, level of nutritional information, nutritional menu context, motivation to process nutritional information, and nutritional knowledge. The second model also contained other factors which could influence the choice of menu item, such as the perceived healthiness of an item, the expectation of taste and diet concerns for health or weight loss. In addition, while this study employed three dependent variables to determine the effects of nutritional information disclosure, in past studies, only consumers’ perceived nutrition had been considered relevant in food choices (Lee & Cranage, 2007; Yoon, Sydny-Busso, & Parsa, 2009). Overall food attitude and purchase intention, however, have been mainly used as proxy measures of the actual food choice. Thus, overall food attitude and purchase intention were included in the final model with other variables. Demographic variables including age, gender, and BMI were also excluded in the model due to non-significance.

Using Hosmer and Lemeshow (H-L)’ goodness of fit test, the models’ fit was tested. Results indicated that the second model was the only well fitted model since it had a p-value greater than the 0.05 level.

According to the results of the logistic regression, the presence of total calorie information had a significant effect on the choice of target menu items (Exp (BTC)=0.62). The odds of a target item over non-target item choice decreased by 0.62 when total
calorie information was provided. Further, when objective nutritional knowledge increased by 1 score, the odds of a target item menu choice decreased by 0.91. However, consumers selected the target items almost 3 times more often when it was placed on the menu with unhealthy menu items as compared to when it was placed in the healthy menu context ($\text{Exp } (B_{NC})=2.99$).

In the second model, it was found that a choice of a target item became 1.44 times more likely with every 1 unit increase in health concern, but that the odds of the target item choice decreased by 0.79 when interest in weight loss increased by 1 unit. In addition, consumers selected target items 2.86 times more often when the expectation of taste increased by 1 unit and 1.35 times more often when the perceived nutritional value of the target item increased by 1 unit.

According to results of the third model, overall food attitude and purchase intention were significantly associated with the choice of target items. A one unit increase in overall food attitude and purchase intention made consumers choose target items 2.27 times more often and 6.25 units more often, respectively. However, nutritional perception and taste were not significant in this model.

The relationship between nutritional information disclosure and item choice was not significantly moderated by motivation to process or nutritional knowledge. Consequently, consumers were more likely to use the total calories information than they were to use the nutritional information of 6 nutrient contents in the choice of a menu item. Nutritional menu context was also an influential factor in choosing a menu item. As expected, overall attitude toward a menu item and purchase intention were good predictors of consumer choice behavior. The results of logistic regression are presented
in Table 4.14.

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Model I</th>
<th>Model II</th>
<th>Model III</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exp(B)^a (S.E.)</td>
<td>Exp(B) (S.E.)</td>
<td>Exp(B) (S.E.)</td>
</tr>
<tr>
<td>Constant</td>
<td>0.63 (0.26)*</td>
<td>0.002 (1.26)***</td>
<td>&lt;0.001 (1.77)***</td>
</tr>
<tr>
<td>Target Item  b</td>
<td>1.22 (0.24)</td>
<td>1.24 (0.31)</td>
<td>1.29 (0.39)</td>
</tr>
<tr>
<td>Total Calories  c</td>
<td>0.62 (0.29)*</td>
<td>0.54 (0.32)**</td>
<td>0.76 (0.41)</td>
</tr>
<tr>
<td>Nutritional Info. of 6 contents  c</td>
<td>0.65 (0.29)</td>
<td>0.67 (0.32)</td>
<td>1.21 (0.41)</td>
</tr>
<tr>
<td>Unhealthy Context</td>
<td>2.99 (0.24)***</td>
<td>2.81 (0.28)***</td>
<td>3.43 (0.37)***</td>
</tr>
<tr>
<td>Motivation</td>
<td>0.99 (0.12)</td>
<td>0.98 (0.16)</td>
<td>1.03 (0.19)</td>
</tr>
<tr>
<td>Objective NK</td>
<td>0.91 (0.05)*</td>
<td>0.90 (0.06)*</td>
<td>0.82 (0.08)***</td>
</tr>
<tr>
<td>Subjective NK</td>
<td>1.05 (0.16)</td>
<td>0.93 (0.18)</td>
<td>0.79 (0.23)</td>
</tr>
<tr>
<td>Diet for Health   d</td>
<td>1.44 (0.19)**</td>
<td>1.47 (0.25)</td>
<td></td>
</tr>
<tr>
<td>Diet for Weight Loss d</td>
<td>0.79 (0.13)*</td>
<td>0.86 (0.16)</td>
<td></td>
</tr>
<tr>
<td>Taste e</td>
<td>2.86 (0.18)***</td>
<td>0.85 (0.27)</td>
<td></td>
</tr>
<tr>
<td>Nutritional Perception</td>
<td></td>
<td>1.35 (0.17)*</td>
<td>0.68 (0.23)</td>
</tr>
<tr>
<td>Overall attitude</td>
<td></td>
<td>2.27 (0.35)**</td>
<td></td>
</tr>
<tr>
<td>Purchase Intention</td>
<td></td>
<td></td>
<td>6.25 (0.47)***</td>
</tr>
<tr>
<td>-2Log Likelihood (\chi^2)</td>
<td>409.42</td>
<td>354.05</td>
<td>235.63</td>
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<td>H-M (\chi^2)</td>
<td>17.65**</td>
<td>10.18</td>
<td>17.75**</td>
</tr>
</tbody>
</table>

Note: *Significant at p<0.1; **Significant at p<0.05; ***Significant at p<0.01.
Standard errors are in the parentheses.
a. Exponential value of a coefficient
b. Indicator variable with reference group = healthy target item
c. No nutritional information condition plays as a reference group.
d. Measured by five-point Likert scale ranged from 1=not interested at all to 5=very interest
e. Measured by five-point Likert scale ranged from 1=very poor to 5=very good

Table 4.14: Results of Logistic Regression Analysis
CHAPTER 5: CONCLUSIONS

The purpose of this study was to examine the effect of nutritional information disclosure on consumer food decision making in a restaurant. Other influential factors in the nutritional information process were also investigated. In detail, this study determined the effect of three different levels of nutritional information and three variables that influence consumer food decision making: menu context, motivation to process nutritional information, and nutritional knowledge.

By means of an experiment, data were collected from undergraduate and graduate students at a large mid-western university and analyzed using several methods of analysis such as analysis of variance, multiple regression, and logistic regression. The results of this study are summarized in this chapter. This chapter also includes conclusions, implications for research and industry areas, and limitations.

5.1 Summary of Results and Discussion

Influence of Providing Nutritional Information

As expected, there was evidence that the disclosure of nutritional information on a menu significantly influenced consumer food attitude and purchase behavior. The presence of nutritional information, both total calories and nutritional information concerning the six nutrient contents, lead consumers to have less favorable attitudes
toward a menu item and less purchase intention for that item. Despite providing nutritional values similar to, or even healthier than, the actual nutritional levels of menu items, consumers evaluated both healthy and unhealthy menu items more negatively. This may be due to the fact that the provided nutritional level of an item on the menu is worse than consumers’ nutritional expectations. Consumers were likely to be disappointed with the manipulated nutritional level of an item, and thus their attitude toward the menu item and purchase intention would be less favorable. This finding supports the results of previous studies which showed that consumers tended to underestimate calories or fat, and that the differences between the expected and the actual nutritional values tend to be greater for unhealthy foods (Burton, et al., 2006; Chandon & Wansink, 2007a, 2007b).

Another interesting finding was that the perceived nutritional evaluation of a menu item was only influenced when the nutritional information provided included the total calories plus five nutrient contents of the item. This implies that consumers did not change their nutritional perception of a menu when total calories alone were provided. On the other hand, the result of logistic regression revealed that total calorie information significantly influenced menu choice. Consumers chose a target item less frequently when exposed to total calories. Rather than processing nutritional information of all six nutrient contents, consumers used only total calorie information in selecting an item, perhaps because calorie information is easy and simple to use in the choice. Thus, consumers are likely to use simple information at the point of purchase, but nutritional information for the six nutrient contents did influence their perception or attitude development processes, which were significant predictors of consumer choice behavior.
Consequently, nutritional information for the six nutrient contents directly influenced food evaluation and purchase intention but only indirectly influenced the actual choice behavior, while total calorie information had a direct effect on overall food attitude, purchase intention, as well as the choice itself. Thus, the presence of total calorie information could encourage consumers to use the presented nutritional information on the menu and to choose the healthy item in a restaurant. However, from a long-term health perspective, it is more important to provide nutritional information for more nutrients and to educate consumers in using broader nutritional information in their choices.

**Influence of Nutritional Menu Context**

In this study, there were several interesting findings which relate to the nutritional menu context. Consistent with prior studies, the nutritional menu context significantly influenced consumer food decision making processes, as well as food choice (Kozup, et al., 2003; Burton & Creyer, 2004). Comparing the provided nutritional information of all alternatives on the menu influenced how consumers perceived the nutritional levels of a target menu item: consumers tended to evaluate an item relative to others. Comparing effects across dependent variables, nutritional menu context had the greatest effect on consumers’ nutritional perception (See Table 4.8). Thus, a menu item accompanied by less healthy items was perceived as a more healthy food and evaluated more favorably than had it been accompanied by healthy items. Furthermore, menu items in the unhealthy context were three times more likely to be chosen than items in the healthy context. Consequently, the context effect existed in evaluating menu items using the
provided nutritional information, and thus nutritional information of alternatives on the menu might be considered as the reference point from which a target item is evaluated. This finding is consistent with prior studies (Burton & Creyer, 2004; Kozup, et al., 2003).

Along with the significant main effect of nutritional menu context, the interaction of nutritional information disclosure with nutritional menu context also had a significant effect on consumer food decision making. The healthy menu context further worsened the negative effect of nutritional information exposure on nutritional perception, food evaluation and purchase intention. This result is consistent with previous studies wherein menu context influenced the effect of nutritional information on consumers food evaluation (Burton & Creyer, 2004; Kozup, et al., 2003). In particular, the presence of total calories in the healthy context had the greatest negative effect on consumer purchase intention (See Table 4.8) among the three dependent variables, while nutritional information for total calories plus five nutrients in the healthy context had an especially negative effect on overall food attitude.

The Role of Motivation to Process Nutritional Information

Although motivation to process nutritional information did not have a significant main effect on consumer food decision making, it played a role as a significant moderator in evaluating a menu item with nutritional information. Nutritional information disclosure interacted with consumer’s motivation to process had a significant effect on perceived nutrition and overall attitude toward a menu item. More specifically, highly motivated consumers perceived the nutritional level of a menu item more negatively only if nutritional information for the six nutrient contents was presented, whereas for
consumers with low or medium levels of motivation to process, exposure to nutritional information for the six nutrient contents lead to improved nutritional perception. Thus, the change in nutritional perception due to the presence of total calories plus five nutrient contents information was greater when the motivation to process nutritional information was high.

Further, when total calorie information was present, the level of consumers’ motivation to process significantly influenced overall food evaluation. Consumers who had medium levels of motivation to process positively evaluated a menu item, while consumers low or high in motivation showed the more negative attitude toward a menu item. However, there was no significant interaction effect between motivation and nutritional information disclosure on purchase intention or on the actual choice of a menu item. Consequently, the motivation to process nutritional information directly moderated the effect of nutritional information disclosure on nutritional perception and overall attitude, but not on purchasing behavior.

The Role of Nutritional Knowledge

Levels of nutritional knowledge were not significantly associated with consumer’s food decision making process; further, knowledge scores did not moderate the main effect of nutritional information disclosure on consumer food evaluation and purchase intention.

However, both objective and subjective nutritional knowledge had positive associations with source credibility ($b_{obj}=0.05$, $p<0.05$; $b_{subj}=0.09$, $p<0.10$). This implies that consumers high in objective or subjective nutritional knowledge believed that the
provided nutritional information was more accurate (See Table D.1 in Appendix D).

Although the presented nutritional values of menu items were manipulated, they were close to the actual nutritional values. Thus, consumers high in nutritional knowledge had more ability to process the provided nutritional information accurately. This result is consistent with previous studies, which indicated that nutritional knowledge had a significant effect on nutrition label use and accuracy of nutritional information use (Drichoutis, et al., 2005; Droms, 2006; Moorman, 1993).

In addition, according to the Elaboration Likelihood Model (Petty & Cacioppo, 1986), the effect of ability to process information on attitude or perception is more effective when consumers have a high level of motivation to process information. This means that there should be a significant effect of nutritional knowledge on consumer food decision making if consumers have enough motivation to process nutritional information. Thus, the effect of nutritional knowledge interacted with motivation to process was further investigated. According to the results of multiple regression, the interaction effect between subjective nutritional knowledge and motivation to process was significant on overall food attitude and purchase intention (overall food attitude: b=-0.12, p<0.05; purchase intention: b=-0.13, p<0.05) (See Table D.2 in Appendix D). This result illustrates a very interesting point about nutritional knowledge. Consumers high in both subjective nutritional knowledge and motivation to process, which are associated with consumers’ psychological state, evaluated a menu item more unfavorably and were less likely to purchase a menu item. The effect of objective nutritional knowledge on consumer food evaluation, however, was not influenced by the level of motivation to process; further, the results of the logistic regression showed that objective nutritional
knowledge directly influenced the choice of a menu item (See Table 4.14). When other variables were held constant, the odds ratio indicated that the choice of a target item over a non-target item became significantly less likely when consumers’ objective nutritional knowledge score increased.

In conclusion, consumers’ nutritional knowledge level did not significantly influence consumers’ food evaluation or purchase intention of a menu item at a restaurant. However, regardless of the presence of nutritional information, consumers’ nutritional knowledge was significantly associated with how accurately they used nutritional information. Also, objective nutritional knowledge itself affected consumer food choice directly, but subjective nutritional knowledge influenced food evaluation and purchase intention only when consumers had enough motivation to process nutritional information. In particular, psychological encouragement is very important for consumers to engage in healthy behaviors.

**Influence of Other variables**

Due to the homogeneous student sample, significant differences in food evaluation, purchase intention and choice itself depending on demographic variables such as age, income, and gender were not found. However, other attributes such as taste expectation or interest in weight loss or health were significantly related to food choice. According to the results of logistic regression model II (Table 4.14), increased nutritional perception or taste expectation lead consumers to select a target item more frequently. In particular, the expected taste of an item (Exp(B)=2.86, p<0.01) had a greater effect on the likelihood of the item choice than did the perceived nutrition of the item (Exp(B)=1.35,
This result is consistent with other previous studies (Lee & Cranage, 2007; Palmer & Leontos, 1995). Moreover, diet concerns for health or weight loss were influential factors; if consumers were more interested in diet for health reasons, the likelihood of the choice of a target item increased 1.44 times; if they were concerned with diet for weight-loss reasons, the likelihood of the choice of a target item decreased. Thus, the structure of consumer food choice behavior in a restaurant is complicated and other influential components should be investigated in the future.

5.2 Conclusions and Implications

As menu labeling legislation requiring nutritional information on menus at restaurants becomes increasingly prevalent, the discussion about whether labeling laws will help improve both consumer healthy eating and the negative image of the restaurant industry has become controversial. Thus, this study examined the effect of nutritional information disclosure on menus and several factors affecting the use of nutritional information in order to provide more effective strategies for policy makers and restaurateurs. Using the experimental design method, several interesting findings were obtained; significant implications for both practical and research areas arose.

Firstly, the results of this study indicate that the availability of nutritional information on the menu influenced consumer food decision making in a restaurant directly or indirectly. At the point of selecting an item in a restaurant, only provision of total calorie information had a significant effect. The law requiring only total calories on the menu, which was enacted by New York City, seems to be more efficient for both consumers in selecting an item and restaurants in designing the menu. However,
nutritional information of other nutrients also played a significant role in changing consumers’ menu choice indirectly. Thus, the influence that providing nutritional information of other nutrients should not be passed over in enacting menu labeling laws. In the case of King County, it is required to post calorie, fat, sodium, and carbohydrate information on menus. But, restaurants using menu boards display only calorie information with price on the board, and nutritional information for other nutrients is offered in a plainly visible format (Conlin, July 27, 2007). The King County model allows consumers to use more nutritional information in selecting food and policy makers to develop more efficient and practical menu labeling regulations.

In addition, both levels of nutritional information – total calories and nutritional information for the six nutrient contents – had significant negative effects on consumer food decision making. When nutritional information was presented on the menu, consumers evaluated the nutritional levels of menu items and overall food more unfavorably and were less likely to purchase items. This implies that consumers expected that menu items were much healthier than they were in reality. Thus, it is necessary to inform consumers of the exact nutritional information of menu items and educate them to process nutritional information accurately.

Consumer nutritional knowledge, both objective and subjective, was associated with the accuracy of the use of nutritional information, and there were significant effects of objective nutritional knowledge on food choice itself. In particular, consumers’ psychological variables, motivation and confidence in using nutritional information (subjective nutritional knowledge) had significant interactional effects on food attitude and purchase intention. Thus, it is important not only to provide more opportunities to
learn about health and nutrition but also to increase consumers’ interest or concern with health and nutritional information.

In the restaurant industry, one way to reduce the negative effect of nutritional information disclosure is to design the menu more effectively. It was found that the nutritional menu context not only influenced consumer food decision making but moderated the effect of nutritional information disclosure. When a menu item was accompanied by healthier items, it was evaluated more unfavorably than when it was accompanied by less healthy items; this effect became stronger when nutritional information was provided. Thus, how items are grouped together on a menu becomes a critical issue. For example, it is possible to design a menu page for only healthy items or a menu emphasizing a few healthy items in an unhealthy context to reduce the context effect. It is beneficial to design a menu providing an unhealthy menu context containing healthy choices, thereby encouraging healthy food choices. Thus, to emphasize a particular item in terms of healthiness, restaurateurs can utilize the menu context effect.

Finally, this study contributes to the existing literature in several ways. Although a number of studies have been conducted meant to determine the effect of nutritional information disclosure, they have been associated with The Nutrition Labeling and Education Act (NLEA) and therefore, limited to packaged foods. This study, however, focused on consumers’ nutritional information use in a restaurant context; the study also identified significant factors that influence consumers’ nutritional information processes, such as motivation to process, nutritional knowledge and menu context. Additionally, it was found that there is a more complicated structure underlying consumer food decision making. The three dependent variables in this study – nutritional perception, overall food
attitude, and purchase intention – were significantly correlated. In addition, nutritional perception did not have a direct relationship with the actual food choice, while other two dependent variables were significant predictors of consumer food choice (See Table 4.14). This result implies that overall food attitude and purchase intention mediated the relationship between nutritional perception and actual food choice, and that consumers’ nutritional perception should be considered as one of the relevant attributes in a food choice decision. Accordingly, this study provides the initial outline of the consumer food decision process when nutritional information is provided; this issue should be dealt with in future research.

5.3 Limitations and Future Research

Although this study provides significant contributions to both research and industry, it has several limitations that may have influenced the results. First, the sample of this study consisted of mainly undergraduate students. This homogenous group facilitated control of other influential demographic factors in the experiment, but the homogeneity also limits the scope of this study to one typical segment of consumers. Student perception and behavior in a restaurant may differ from the behavior of others, such as people who are older or less educated. Thus, the findings cannot be generalized to all consumers in other market segments. It would therefore be helpful to conduct the same experiment targeting other market segmentation.

Additionally, the number of respondents in each condition was only 26 or 27, which is a relatively small sample size even though the total sample size was sufficient, more than 300. Thus, a larger sample size would allow for stronger results.
Target items were always accompanied by alternatives on the menu so as to mimic a real restaurant situation as closely as possible: there is no restaurant menu where only one item is offered on the menu. However, this requires that menu context must always be controlled for in testing other effects such as the main effects of nutritional information disclosure, motivation to process, and nutritional knowledge. Identification of the effects of other variables would have been facilitated by the presence of a control group, a group which was not provided with a menu context. Thus, future study should employ a modified experimental design including three different types of menu context: absence, healthy, and unhealthy contexts.

Another limitation of the study is due to the selected menu items. This study adopted menu items only available in a casual or fine dining restaurant, and only chicken items were offered to eliminate food preferences. Thus, there is a possibility that consumers use different evaluation criteria or decision making processes when nutritional information is provided in fast food restaurants. Furthermore, it was found that meat was another preferred food source (34%), so consumers’ food preferences were not represented in food decision making. Even if vegetarians only represented a small portion of the sample (3%), they remain another segment of consumers. Thus, there might be differences in evaluation or decision making processes depending upon consumers’ food preference.

In addition to food preference, taste of food is another critical factor that influences food choice. In the study conducted by Dorms (2006), it was found that consumers are more likely to choose tasty foods when they eat out because they prefer to enjoy themselves regardless of money or health. Lee and Cranage (2007) also found that
the relative importance of taste in menu selection was greater than the importance of nutrition. Therefore, in future research, how food preferences and taste influence consumers’ use and process of the provided nutritional information should be investigated.

Next, the questions used to measure objective knowledge were selected from existing questionnaires, which were related to the provided six nutrient contents. Although the questions were tested through two pilot tests, they did not provide a standardized instrument for measuring the nutritional knowledge level. There were 7 questions with rates of the correct answer between 50% and 80%, and more than 80% of respondents answered correctly for other 2 questions (See Table E.1 in Appendix E). Despite of the moderate level of nutritional knowledge questions, the mean score of objective nutritional knowledge was 8.17, which indicates the average rate of correct answers is just 54%. Thus, in this study, the objective nutritional knowledge measures in particular may be of concern. A scale to measure nutritional knowledge efficiently and accurately should be developed.

A final issue that can be considered in a future study is the relationship among influential factors on consumer food decision. In this study, how taste and diet concerns influenced food choice was investigated. However, consumer food choice at a restaurant could be affected by other important factors such as food quality, taste, menu variety, price, convenience, and ambience (Lee & Cranage, 2007; Neumark-Sztainer, Story, Perry, & Casey, 1999; Yoon, et al., 2009). Similar to the results obtained though the logistic regression in this study, the taste of food, which was considered as the most important factor on food choice, was closely associated with health. According to Raghunathan, et
al. (2006), consumers would choose a tasty food rather than a healthy food if they have to make a choice between them. Additionally, other individual characteristics, besides of motivation to process information and nutritional knowledge, should influence the use of nutritional information and consumer food choice in restaurants. As shown in the logistic regression result, for instance, consumers’ diet concern was a significant predictor of food choice. Thus, how the disclosure of nutritional information is associated with other influential factors and what other factors can influence the use of nutritional information should be investigated in future study.
References


Appendix A: Questionnaire of Pre-test I
We are seeking your reactions to a situation that you might encounter concerning meal selection in a restaurant. Please respond to the questions in a natural manner.

There are *no right or wrong* answers; We want your honest opinions.

Please carefully read all information presented on the menu. Later we will ask you to provide your reaction to the information.

Participation is voluntary. If you decide not to participate, there will be no penalty or loss of benefits. You can stop participating at any time, without any penalty. You will still receive extra credits if you stop.

If you have any additional questions concerning this research or your participation in it, please feel free to contact me or my advisor at any time.

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Email: george.2@osu.edu
Imagine you are about to order an entrée from the following menu at a casual dining restaurant.

**Menu**

- **Chicken Caesar Salad**
  Grilled chicken served on top of romaine lettuce in a creamy and garlicky Caesar dressing topped with parmesan cheese and croutons

- **Classic Sirloin**
  Sirloin is justifiably America's favorite steak. A generous 10–oz. cut, expertly seasoned and fire–grilled just the way you like it

- **Lemon-Herb Roasted Chicken**
  Roasted half–chicken seasoned with a Light Lemon Garlic-Herb Sauce.

- **Chicken Fajitas**
  Juicy chicken served on a skillet that sizzles like the Southwest sun. Served with southwest rice, guacamole, sour cream, pico de gallo, caramelized onions, green peppers and Jack-cheddar cheese.

- **Chicken Marsala**
  Sauteed chicken breasts in a savory sauce of mushrooms, garlic and marsala wine.

- **Grilled Salmon**
  An herb seasoned filet of Coho Salmon that is fire-grilled served over rice pilaf comes with broccoli, tartar sauce, and a lemon wedge, for a light and delicious seafood feast.

- **Grilled Pork Chop**
  A generous 10–oz. cut, seasoned and fire–grilled pork chop.

- **California Turkey Club**
  Slices of roasted turkey piled high on marble wheat bread and topped with Jack cheese, lettuce, sliced tomatoes, smoked bacon and creamy avocado-ranch

*All menu items will be served in a dinner portion size.*
1. Think about your preferences. Please select three items you like the most from the menu above.

__________________________________________

2. Of the items you listed in Question 1, which would you most prefer?

__________________________________________

__________________________________________

The following questions are general questions about nutritional knowledge. Please answer based on your knowledge. If you don’t know the answer, please do not guess. Circle the “Don’t know” option.

1. Saturated fats are usually found in ________.
   a. Vegetable and vegetable oils   b. Animal products like meat and dairy
   c. Grain products such as bread and cereal   d. None of the above
   e. Don’t know

2. Which kind of fat is more likely to raise the blood cholesterol level?
   a. Saturated fats   b. Polyunsaturated fats
   c. Both of them   d. None of the above
   e. Don’t know

3. Risk of high blood pressure is most likely to be reduced by eating a diet with U _______.
   a. Less sugar   b. More fiber
   c. More iron   d. Less salt
   e. Don’t know

4. Which food group provides protein, B vitamins, iron, and zinc?
   a. Meat, poultry and fish   b. Milk and dairy products
   c. Fruits   d. Grain products such as bread and cereal
   e. Don’t know

5. Cholesterol is found in ________.
   a. Vegetables and vegetable oils   b. All foods containing fat or oil
   c. Animal products like meat and dairy   d. None of above
   e. Don’t know
6. If you eat 2000 calories a day, your daily sodium intake should be less than how many milligrams?
   a. 500mg  
   b. 2400mg  
   c. 4300mg  
   d. 6000mg  
   e. Don’t know

7. Which food group is our body's best source of energy?
   a. Meat Group  
   b. Fats, oils and sweets  
   c. Breads and cereals  
   d. Milk and cheese  
   e. Don’t know

8. Which of the following is not considered a nutrient?
   a. Vitamins  
   b. Minerals  
   c. Fiber  
   d. Fats  
   e. Don’t know

9. Which of the following is added to a food label because people sometimes don’t eat enough of this?
   a. Fat  
   b. Calcium  
   c. Sodium  
   d. Cholesterol  
   e. Don’t know

10. The bread, cereal, rice and pasta group is a good source of ______.
    a. Carbohydrate  
    b. Vitamin C  
    c. Calcium  
    d. Vitamin D  
    e. Don’t know

11. Which of the following is required on a food label?
    a. Total carbohydrate  
    b. Sugars  
    c. Iron  
    d. All of the above  
    e. Don’t know

12. Citrus fruits are an excellent source of ______.
    a. Calcium  
    b. Vitamin C  
    c. Vitamin B  
    d. Calories  
    e. Don’t know

13. Foods such as the meat, poultry, fish, dry beans, eggs and nuts are an important source of ______.
    a. Iron  
    b. Fiber  
    c. Beta carotene  
    d. Calcium  
    e. Don’t know
14. In general, which food contains the most fat?
   a. Graham crackers  b. Brownies
   c. Pudding          d. Angel food cake
   e. Don’t know

15. The milk, cheese and yogurt group are important for _____.
   a. Strong bones  b. Teeth
   c. Muscles       d. All of the above
   e. Don’t know

16. How many servings of vegetables do we need each day?
   a. 1-2          b. 2-3
   c. 3-5          d. 6-11
   e. Don’t know

How important is each of the following when you choose a menu item in a restaurant?

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<thead>
<tr>
<th></th>
<th>Not important at all</th>
<th>Very Important</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>1--------------2------3------------4---------------5</td>
<td></td>
</tr>
<tr>
<td>Cholesterol</td>
<td>1--------------2------3------------4---------------5</td>
<td></td>
</tr>
<tr>
<td>Dietary fiber</td>
<td>1--------------2------3------------4---------------5</td>
<td></td>
</tr>
<tr>
<td>Protein</td>
<td>1--------------2------3------------4---------------5</td>
<td></td>
</tr>
<tr>
<td>Saturated fat</td>
<td>1--------------2------3------------4---------------5</td>
<td></td>
</tr>
<tr>
<td>Sodium</td>
<td>1--------------2------3------------4---------------5</td>
<td></td>
</tr>
<tr>
<td>Sugar</td>
<td>1--------------2------3------------4---------------5</td>
<td></td>
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<tr>
<td>Total calories</td>
<td>1--------------2------3------------4---------------5</td>
<td></td>
</tr>
<tr>
<td>Total fat</td>
<td>1--------------2------3------------4---------------5</td>
<td></td>
</tr>
<tr>
<td>Trans fat</td>
<td>1--------------2------3------------4---------------5</td>
<td></td>
</tr>
</tbody>
</table>
Consider the following menu item and answer the questions;

- **Chicken Caesar Salad**

  Grilled chicken served on top of romaine lettuce in a creamy and garlicky Caesar dressing topped with parmesan cheese and croutons

  930 Calories  71g Total Fat  13g Saturated Fat  
  28g Carbohydrates  43g Protein  6g Dietary Fiber  1840mg Sodium

  1. Based on the information, how important would this menu item be as part of a healthy diet?
     Not Important at all 1---------2------ ---3---------4---------5 Very Important

  2. How would you rate the level of nutrition suggested by the information of this menu item?
     Not Nutritious at all 1---------2------ ---3---------4---------5 Very Nutritious

  3. How would you evaluate the healthiness of this menu item?
     Very Unhealthy 1------ ---2---------3---------4---------5 Very Healthy

  4. To what extent do you consider the nutritional information of this menu item to be accurate?
     Very Inaccurate 1-------- -2---------3---------4---------5 Very Accurate

  5. To what extent do you consider the nutritional information of this menu item to be credible?
     Very Unreliable 1---------2------ ---3---------4---------5 Very Reliable

Consider the following menu item and answer the questions;

- **Classic Sirloin Steak**

  Sirloin is justifiably America's favorite steak. A generous 10–oz. cut, expertly seasoned and fire–grilled just the way you like it

  690 Calories  44g Total Fat  18g Saturated Fat  
  4g Carbohydrates  58g Protein  0g Dietary Fiber  430mg Sodium

  1. Based on the information, how important would this menu item be as part of a healthy diet?
     Not Important at all 1---------2------ ---3---------4---------5 Very Important

  2. How would you rate the level of nutrition suggested by the information of this menu item?
     Not Nutritious at all 1---------2------ ---3---------4---------5 Very Nutritious

  3. How would you evaluate the healthiness of this menu item?
     Very Unhealthy 1------ ---2---------3---------4---------5 Very Healthy

  4. To what extent do you consider the nutritional information of this menu item to be accurate?
     Very Inaccurate 1-------- -2---------3---------4---------5 Very Accurate

  5. To what extent do you consider the nutritional information of this menu item to be credible?
     Very Unreliable 1---------2------ ---3---------4---------5 Very Reliable
Consider the following menu item and answer the questions;

**Lemon-herb Roasted Chicken**
Roasted half–chicken seasoned with a Light Lemon Garlic-Herb Sauce.

<table>
<thead>
<tr>
<th>Calories</th>
<th>Total Fat</th>
<th>Saturated Fat</th>
<th>Carbohydrates</th>
<th>Protein</th>
<th>Dietary Fiber</th>
<th>Sodium</th>
</tr>
</thead>
<tbody>
<tr>
<td>410</td>
<td>10g</td>
<td>2g</td>
<td>50g</td>
<td>34g</td>
<td>9g</td>
<td>300mg</td>
</tr>
</tbody>
</table>

1. Based on the information, how important would this menu item be as part of a healthy diet?
   Not Important at all 1---------2------ ---3---------4---------5 Very Important

2. How would you rate the level of nutrition suggested by the information of this menu item?
   Not Nutritious at all 1---------2------ ---3---------4---------5 Very Nutritious

3. How would you evaluate the healthiness of this menu item?
   Very Unhealthy 1------ ---2---------3---------4---------5 Very Healthy

4. To what extent do you consider the nutritional information of this menu item to be accurate?
   Very Inaccurate 1-------- -2---------3---------4---------5 Very Accurate

5. To what extent do you consider the nutritional information of this menu item to be credible?
   Very Unreliable 1---------2------ ---3---------4---------5 Very Reliable

Consider the following menu item and answer the questions;

**Chicken Fajitas**
Juicy chicken served on a skillet that sizzles like the Southwest sun. Served with southwest rice, guacamole, sour cream, pico de gallo, caramelized onions, green peppers and Jack-cheddar cheese.

<table>
<thead>
<tr>
<th>Calories</th>
<th>Total Fat</th>
<th>Saturated Fat</th>
<th>Carbohydrates</th>
<th>Protein</th>
<th>Dietary Fiber</th>
<th>Sodium</th>
</tr>
</thead>
<tbody>
<tr>
<td>851</td>
<td>29g</td>
<td>6g</td>
<td>90g</td>
<td>56g</td>
<td>6g</td>
<td>2002mg</td>
</tr>
</tbody>
</table>

1. Based on the information, how important would this menu item be as part of a healthy diet?
   Not Important at all 1---------2------ ---3---------4---------5 Very Important

2. How would you rate the level of nutrition suggested by the information of this menu item?
   Not Nutritious at all 1---------2------ ---3---------4---------5 Very Nutritious

3. How would you evaluate the healthiness of this menu item?
   Very Unhealthy 1------ ---2---------3---------4---------5 Very Healthy

4. To what extent do you consider the nutritional information of this menu item to be accurate?
   Very Inaccurate 1-------- -2---------3---------4---------5 Very Accurate

5. To what extent do you consider the nutritional information of this menu item to be credible?
   Very Unreliable 1---------2------ ---3---------4---------5 Very Reliable
Consider the following menu item and answer the questions;

### Grilled Pork Chop

A generous 10–oz. cut, seasoned and fire–grilled pork chop.

<table>
<thead>
<tr>
<th>Calories</th>
<th>Total Fat</th>
<th>Saturated Fat</th>
<th>Carbohydrates</th>
<th>Protein</th>
<th>Dietary Fiber</th>
<th>Sodium</th>
</tr>
</thead>
<tbody>
<tr>
<td>310</td>
<td>12g</td>
<td>6g</td>
<td>0g</td>
<td>0g</td>
<td>0g</td>
<td>75mg</td>
</tr>
</tbody>
</table>

1. Based on the information, how important would this menu item be as part of a healthy diet?
   - Not Important at all 1---------2------ ---3---------4---------5 Very Important

2. How would you rate the level of nutrition suggested by the information of this menu item?
   - Not Nutritious at all 1---------2------ ---3---------4---------5 Very Nutritious

3. How would you evaluate the healthiness of this menu item?
   - Very Unhealthy 1------ ---2---------3---------4---------5 Very Healthy

4. To what extent do you consider the nutritional information of this menu item to be accurate?
   - Very Inaccurate 1---------2------ ---3---------4---------5 Very Accurate

5. To what extent do you consider the nutritional information of this menu item to be credible?
   - Very Unreliable 1---------2------ ---3---------4---------5 Very Reliable

### Grilled Salmon

An herb seasoned filet of Coho Salmon that is fire-grilled served over rice pilaf comes with Broccoli, tartar sauce, and a lemon wedge, for a light and delicious seafood feast.

<table>
<thead>
<tr>
<th>Calories</th>
<th>Total Fat</th>
<th>Saturated Fat</th>
<th>Carbohydrates</th>
<th>Protein</th>
<th>Dietary Fiber</th>
<th>Sodium</th>
</tr>
</thead>
<tbody>
<tr>
<td>393</td>
<td>19g</td>
<td>4.5g</td>
<td>14g</td>
<td>44g</td>
<td>7g</td>
<td>520mg</td>
</tr>
</tbody>
</table>

1. Based on the information, how important would this menu item be as part of a healthy diet?
   - Not Important at all 1---------2------ ---3---------4---------5 Very Important

2. How would you rate the level of nutrition suggested by the information of this menu item?
   - Not Nutritious at all 1---------2------ ---3---------4---------5 Very Nutritious

3. How would you evaluate the healthiness of this menu item?
   - Very Unhealthy 1------ ---2---------3---------4---------5 Very Healthy

4. To what extent do you consider the nutritional information of this menu item to be accurate?
   - Very Inaccurate 1---------2------ ---3---------4---------5 Very Accurate

5. To what extent do you consider the nutritional information of this menu item to be credible?
   - Very Unreliable 1---------2------ ---3---------4---------5 Very Reliable

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Consider the following menu item and answer the questions;

<table>
<thead>
<tr>
<th><strong>California Turkey Club</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Slices of roasted turkey piled high on marble wheat bread and topped with Jack cheese, lettuce, sliced tomatoes, smoked bacon and creamy avocado-ranch</td>
</tr>
<tr>
<td>510 Calories</td>
</tr>
</tbody>
</table>

1. Based on the information, how important would this menu item be as part of a healthy diet?  
   Not Important at all 1---------2------ ---3---------4---------5 Very Important  

2. How would you rate the level of nutrition suggested by the information of this menu item?  
   Not Nutritious at all 1---------2------ ---3---------4---------5 Very Nutritious  

3. How would you evaluate the healthiness of this menu item?  
   Very Unhealthy 1------ ---2---------3---------4---------5 Very Healthy  

4. To what extent do you consider the nutritional information of this menu item to be accurate?  
   Very Inaccurate 1-------- -2---------3---------4---------5 Very Accurate  

5. To what extent do you consider the nutritional information of this menu item to be credible?  
   Very Unreliable 1---------2------ ---3---------4---------5 Very Reliable  

Consider the following menu item and answer the questions;

<table>
<thead>
<tr>
<th><strong>Classic Marsala</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Sautéed chicken breasts in a savory sauce of mushrooms, garlic and marsala wine</td>
</tr>
<tr>
<td>973 Calories</td>
</tr>
</tbody>
</table>

1. Based on the information, how important would this menu item be as part of a healthy diet?  
   Not Important at all 1---------2------ ---3---------4---------5 Very Important  

2. How would you rate the level of nutrition suggested by the information of this menu item?  
   Not Nutritious at all 1---------2------ ---3---------4---------5 Very Nutritious  

3. How would you evaluate the healthiness of this menu item?  
   Very Unhealthy 1------ ---2---------3---------4---------5 Very Healthy  

4. To what extent do you consider the nutritional information of this menu item to be accurate?  
   Very Inaccurate 1-------- -2---------3---------4---------5 Very Accurate  

5. To what extent do you consider the nutritional information of this menu item to be credible?  
   Very Unreliable 1---------2------ ---3---------4---------5 Very Reliable
You have received and evaluated the nutritional information of all 8 menu items. Do you want to change your choice of menu item that you selected at the beginning of the survey?
   a. No               b. Yes

If yes, which alternative menu item do you want to choose?

Please rank the following from 1 to 11 by the order of importance when you choose a menu item in a restaurant. (1 = Most Important; 11 = Least Important)
   Calories from fat (    )
   Carbohydrates (     )
   Cholesterol (      )
   Dietary Fiber (    )
   Protein (         )
   Saturated fat (    )
   Sodium (         )
   Sugar (          )
   Total Calories (   )
   Total fat (      )
   Trans fat (     )

The following questions are general questions about you.

1. Please indicate your gender.
   a. Male               b. Female

2. Please indicate your age.
   a. 18-20 years old   b. 21-23 years old   c. 24-26 years old
   d. 27-30 years old   e. 31-35 years old   f. More than 35 years old

3. Please indicate which of the following best describe your status.
   a. Freshman          b. Sophomore          c. Junior
   d. Senior            e. Graduate           f. Faculty or Staff

4. Please indicate your ethnicity/nationality.
   a. Caucasian         b. African American   c. Hispanic
   d. Asian             e. Native American    f. Other (       )

5. Please indicate your monthly income.
   a. Under $1,000      b. $1,001 - $2,000   c. $2,001 - $3,000
   d. $3,001 - $5,000   e. $5,001 - $7,000   f. Over $7,000

6. Please indicate your monthly expenditure on food away from home.
   a. Under $100        b. $100 - $200      c. $201 - $300
   d. $301 - $400      e. $401 - $500      f. Over $500
Appendix B: Questionnaire of Pre-test II
We are seeking your reactions to a situation that you might encounter concerning meal selection in a restaurant. Please respond to the questions in a natural manner. There are no right or wrong answers; We want your honest opinions.

Please carefully read all information presented on the menu. Later we will ask you to provide your reaction to the information.

Participation is voluntary. If you decide not to participate, there will be no penalty or loss of benefits. You can stop participating at any time, without any penalty. You will still receive extra credits if you stop.

If you have any additional questions concerning this research or your participation in it, please feel free to contact me or my advisor at any time.

Hae Jin Yoon
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Department of Consumer Sciences
The Ohio State University
Phone: (614) 537-8779
Email: yoon.114@osu.edu

Dr. Thomas George
Associate Professor
Department of Consumer Sciences
The Ohio State University
Phone: (614) 292-6219
Email: george.2@osu.edu

Imagine you are about to order an entrée from the following menu at a casual dining restaurant.
Section I: Menu Evaluation

The following questions are general questions about Chicken Caesar Salad on the menu. Please answer what is being asked based on your opinion.

- **Chicken Caesar Salad**

  Grilled chicken served on top of romaine lettuce in a creamy and garlicky Caesar dressing topped with parmesan cheese and croutons.

  900 Calories  43g Total fat (66% DV)  13g Saturated Fat (65% DV)  201mg Cholesterol (67% DV)  1560mg Sodium (65% DV)  13g Protein (26% DV)

  Percent Daily Values (DV) are based on a 2,000 calorie diet.

<table>
<thead>
<tr>
<th>Question</th>
<th>Scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Based on the information shown, to what extent do you expect the taste of Chicken Caesar Salad?</td>
<td>Very Poor: 1----2------3------4------5 Very Good</td>
</tr>
<tr>
<td>2. Based on the information provided, how important would Chicken Caesar Salad be as part of a healthy diet?</td>
<td>Not Important at all: 1----2------3------4------5 Very Important</td>
</tr>
<tr>
<td>3. How would you rate the level of nutrition suggested by the information of Chicken Caesar Salad?</td>
<td>Not Nutritious at all: 1----2------3------4------5 Very Nutritious</td>
</tr>
<tr>
<td>4. How would you evaluate the healthiness of Chicken Caesar Salad?</td>
<td>Very Unhealthy: 1----2------3------4------5 Very Healthy</td>
</tr>
<tr>
<td>5. Overall, how much are you favorable toward Chicken Caesar Salad?</td>
<td>Very Unfavorable: 1----2------3------4------5 Very Favorable</td>
</tr>
<tr>
<td>6. Overall, how much do you prefer Chicken Caesar Salad?</td>
<td>Very Dislike: 1----2------3------4------5 Very Like</td>
</tr>
<tr>
<td>7. What is your overall feeling toward Chicken Caesar Salad?</td>
<td>Very Negative: 1----2------3------4------5 Very Positive</td>
</tr>
<tr>
<td>8. How probable is it that you would consider the purchase of Chicken Caesar Salad?</td>
<td>Not Probable at all: 1----2------3------4------5 Very Probable</td>
</tr>
<tr>
<td>9. How willing would you be to purchase Chicken Caesar Salad again?</td>
<td>Very Unlikely: 1----2------3------4------5 Very Likely</td>
</tr>
<tr>
<td>10. How likely would you be to purchase Chicken Caesar Salad based on the given information?</td>
<td>Very Unlikely: 1----2------3------4------5 Very Likely</td>
</tr>
</tbody>
</table>
The following questions are general questions about Lemon Herb Roasted Chicken on the menu. Please answer what is being asked based on your opinion.

- **Lemon Herb Roasted Chicken**
  Roasted half–chicken seasoned with a Light Lemon Garlic-Herb Sauce.

<table>
<thead>
<tr>
<th>460 Calories</th>
<th>8g Total fat (12% DV)</th>
<th>2.5g Saturated Fat (12.5% DV)</th>
<th>40mg Cholesterol (13% DV)</th>
<th>264mg Sodium (11% DV)</th>
<th>34g Protein (68% DV)</th>
</tr>
</thead>
</table>

Percent Daily Values (DV) are based on a 2,000 calorie diet.

1. Based on the information shown, to what extent do you expect the taste of Lemon Herb Roasted Chicken?
   - **Very Poor**
   - 1--------2--------3--------4--------5 **Very Good**

2. Based on the information provided, how important would Lemon Herb Roasted Chicken be as part of a healthy diet?
   - **Not Important at all**
   - 1--------2--------3--------4--------5 **Very Important**

3. How would you rate the level of nutrition suggested by the information of Lemon Herb Roasted Chicken?
   - **Not Nutritious at all**
   - 1--------2--------3--------4--------5 **Very Nutritious**

4. How would you evaluate the healthiness of Lemon Herb Roasted Chicken?
   - **Very Unhealthy**
   - 1--------2--------3--------4--------5 **Very Healthy**

5. Overall, how much are you favorable toward Lemon Herb Roasted Chicken?
   - **Very Unfavorable**
   - 1--------2--------3--------4--------5 **Very Favorable**

6. Overall, how much do you prefer Lemon Herb Roasted Chicken?
   - **Very Dislike**
   - 1--------2--------3--------4--------5 **Very Like**

7. What is your overall feeling toward Lemon Herb Roasted Chicken?
   - **Very Negative**
   - 1--------2--------3--------4--------5 **Very Positive**

8. How probable is it that you would consider the purchase of Lemon Herb Roasted Chicken?
   - **Not Probable at all**
   - 1--------2--------3--------4--------5 **Very Probable**

9. How willing would you be to purchase Lemon Herb Roasted Chicken again?
   - **Very Unlikely**
   - 1--------2--------3--------4--------5 **Very Likely**

10. How likely would you be to purchase Lemon Herb Roasted Chicken based on the given information?
    - **Very Unlikely**
    - 1--------2--------3--------4--------5 **Very Likely**
The following questions are general questions about Chicken Fajitas on the menu. Please answer what is being asked based on your opinion.

- **Chicken Fajitas**
  Juicy chicken served with southwest rice, guacamole, sour cream, pico de gallo, caramelized onions, green peppers and Jack-cheddar cheese.

  830 Calories  38g Total fat (58% DV)  12g Saturated Fat (60% DV)  186mg Cholesterol (62% DV)  1464mg Sodium (61% DV)  15g Protein (30% DV)

  Percent Daily Values (DV) are based on a 2,000 calorie diet.

<table>
<thead>
<tr>
<th>Question</th>
<th>Very Unhealthy</th>
<th>1--------2--------3--------4--------5</th>
<th>Very Like</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Based on the information shown, to what extent do you expect the taste of Chicken Fajitas?</td>
<td>1---------------2---------------3---------------4---------------5</td>
<td>Very Good</td>
<td></td>
</tr>
<tr>
<td>2. Based on the information provided, how important would Chicken Fajitas be as part of a healthy diet?</td>
<td>1---------------2---------------3---------------4---------------5</td>
<td>Very Important</td>
<td></td>
</tr>
<tr>
<td>3. How would you rate the level of nutrition suggested by the information of Chicken Fajitas?</td>
<td>1---------------2---------------3---------------4---------------5</td>
<td>Very Nutritious</td>
<td></td>
</tr>
<tr>
<td>4. How would you evaluate the healthiness of Chicken Fajitas?</td>
<td>1---------------2---------------3---------------4---------------5</td>
<td>Very Healthy</td>
<td></td>
</tr>
<tr>
<td>5. Overall, how much are you favorable toward Chicken Fajitas?</td>
<td>1---------------2---------------3---------------4---------------5</td>
<td>Very Favorable</td>
<td></td>
</tr>
<tr>
<td>6. Overall, how much do you prefer Chicken Fajitas?</td>
<td>1---------------2---------------3---------------4---------------5</td>
<td>Very Like</td>
<td></td>
</tr>
<tr>
<td>7. What is your overall feeling toward Chicken Fajitas?</td>
<td>1---------------2---------------3---------------4---------------5</td>
<td>Very Positive</td>
<td></td>
</tr>
<tr>
<td>8. How probable is it that you would consider the purchase of Chicken Fajitas?</td>
<td>1---------------2---------------3---------------4---------------5</td>
<td>Very Probable</td>
<td></td>
</tr>
<tr>
<td>9. How willing would you be to purchase Chicken Fajitas again?</td>
<td>1---------------2---------------3---------------4---------------5</td>
<td>Very Likely</td>
<td></td>
</tr>
<tr>
<td>10. How likely would you be to purchase Chicken Fajitas based on the given information?</td>
<td>1---------------2---------------3---------------4---------------5</td>
<td>Very Likely</td>
<td></td>
</tr>
</tbody>
</table>
The following questions are general questions about Grilled Chicken on the menu. Please answer what is being asked based on your opinion.

<table>
<thead>
<tr>
<th>1. Based on the information shown, to what extent do you expect the taste of Grilled Chicken?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Poor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. Based on the information provided, how important would Grilled Chicken be as part of a healthy diet?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Important at all</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. How would you rate the level of nutrition suggested by the information of Grilled Chicken?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Nutritious at all</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. How would you evaluate the healthiness of Grilled Chicken?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Unhealthy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. Overall, how much are you favorable toward Grilled Chicken?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Unfavorable</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. Overall, how much do you prefer Grilled Chicken?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Dislike</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7. What is your overall feeling toward Grilled Chicken?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Negative</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8. How probable is it that you would consider the purchase of Grilled Chicken?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not Probable at all</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9. How willing would you be to purchase Grilled Chicken again?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Unlikely</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>10. How likely would you be to purchase Grilled Chicken based on the given information?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Unlikely</td>
</tr>
</tbody>
</table>
The following questions are general questions about Chicken Marsala on the menu. Please answer what is being asked based on your opinion.

- **Chicken Marsala**
  
  Sauteed chicken breasts in a savory sauce of mushrooms, garlic and marsala wine.
  
  920 Calories  46g Total fat (71% DV)  15g Saturated Fat (75% DV)  216mg Cholesterol (72% DV)  1680mg Sodium (70% DV)  10g Protein (20% DV)
  
  Percent Daily Values (DV) are based on a 2,000 calorie diet

<table>
<thead>
<tr>
<th>Question</th>
<th>Rating Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Based on the information shown, to what extent do you expect the taste of Chicken Marsala?</td>
<td>Very Poor 1-------- --2----------3----------4----------5 Very Good</td>
</tr>
<tr>
<td>2. Based on the information provided, how important would Chicken Marsala be as part of a healthy diet?</td>
<td>Not Important at all 1---------2-------- --3----------4----------5 Very Important</td>
</tr>
<tr>
<td>3. How would you rate the level of nutrition suggested by the information of Chicken Marsala?</td>
<td>Not Nutritious at all 1-------- --2----------3----------4----------5 Very Nutritious</td>
</tr>
<tr>
<td>4. How would you evaluate the healthiness of Chicken Marsala?</td>
<td>Very Unhealthy 1---------2----------3----------4----------5 Very Healthy</td>
</tr>
<tr>
<td>5. Overall, how much are you favorable toward Chicken Marsala?</td>
<td>Very Unfavorable 1-------- --2----------3----------4----------5 Very Favorable</td>
</tr>
<tr>
<td>6. Overall, how much do you prefer Chicken Marsala?</td>
<td>Very Dislike 1-------- --2----------3----------4----------5 Very Like</td>
</tr>
<tr>
<td>7. What is your overall feeling toward Chicken Marsala?</td>
<td>Very Negative 1-------- --2----------3----------4----------5 Very Positive</td>
</tr>
<tr>
<td>8. How probable is it that you would consider the purchase of Chicken Marsala?</td>
<td>Not Probable at all 1-------- --2----------3----------4----------5 Very Probable</td>
</tr>
<tr>
<td>9. How willing would you be to purchase Chicken Marsala again?</td>
<td>Very Unlikely 1-------- --2----------3----------4----------5 Very Likely</td>
</tr>
<tr>
<td>10. How likely would you be to purchase Chicken Marsala based on the given information?</td>
<td>Very Unlikely 1-------- --2----------3----------4----------5 Very Likely</td>
</tr>
</tbody>
</table>

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1. Based on the information shown, to what extent do you expect the taste of Italian Chicken Sandwich?

Very Poor  1-------- 2---------- 3-------- 4---------- 5  Very Good

2. Based on the information provided, how important would Italian Chicken Sandwich be as part of a healthy diet?

Not Important at all  1-------- 2---------- 3-------- 4---------- 5  Very Important

3. How would you rate the level of nutrition suggested by the information of Italian Chicken Sandwich?

Not Nutritious at all  1-------- 2---------- 3-------- 4---------- 5  Very Nutritious

4. How would you evaluate the healthiness of Italian Chicken Sandwich?

Very Unhealthy  1-------- 2---------- 3-------- 4---------- 5  Very Healthy

5. Overall, how much are you favorable toward Italian Chicken Sandwich?

Very Unfavorable  1-------- 2---------- 3-------- 4---------- 5  Very Favorable

6. Overall, how much do you prefer Italian Chicken Sandwich?

Very Dislike  1-------- 2---------- 3-------- 4---------- 5  Very Like

7. What is your overall feeling toward Italian Chicken Sandwich?

Very Negative  1-------- 2---------- 3-------- 4---------- 5  Very Positive

8. How probable is it that you would consider the purchase of Italian Chicken Sandwich?

Not Probable at all  1-------- 2---------- 3-------- 4---------- 5  Very Probable

9. How willing would you be to purchase Italian Chicken Sandwich again?

Very Unlikely  1-------- 2---------- 3-------- 4---------- 5  Very Likely

10. How likely would you be to purchase Italian Chicken Sandwich based on the given information?

Very Unlikely  1-------- 2---------- 3-------- 4---------- 5  Very Likely
Section II: Menu Choice

1. Based on the previous menu items, which one are you most likely to choose?

   a. Chicken Caesar Salad
   b. Lemon Herb Roasted
   c. Chicken Fajitas
   d. Grilled Chicken
   e. Chicken Marsala
   f. Italian Chicken Sandwich

2. Which of side items on the below menu would you like to select accompanying with your entrée that you chose? (Please select one)

   a. House Salad
      (210 calories, 12g Total Fat, 6g Saturated Fat, 10g protein, 310mg Sodium without dressing)

   b. Mashed Potato
      (270 calories, 14g Total Fat, 2g Saturated Fat, 5g protein, 950mg Sodium)

   c. Baked Potato
      (250 calories, 18g Total Fat, 11g Saturated Fat, 9g protein, 910mg Sodium)

   d. Basket of Fries
      (430 calories, 26g Total Fat, 4.5g Saturated Fat, 4g protein, 240mg Sodium)

   e. Fresh Steamed Vegetables
      (70 calories, 5g Total Fat, 1g Saturated Fat, 3g protein, 195mg Sodium)

   f. French Onion Soup
      (388 calories, 21g Total Fat, 0g Saturated Fat, 19g protein, 2317mg Sodium)

   g. None
Section III: Nutritional Knowledge

The following questions are general questions about nutritional knowledge. Please answer based on your knowledge. If you don’t know the answer, please do not guess. Circle the “Don’t know” option.

1. Which kind of fat is higher in calories?
   a. Saturated fats
   b. Polyunsaturated fats
   c. They are both the same
   d. None of the above
   e. Don’t know

2. Risk of high blood pressure is most likely to be reduced by eating a diet with _____.
   a. Less sugar
   b. More fiber
   c. More iron
   d. Less salt
   e. Don’t know

3. Which food group provides protein, B vitamins, iron, and zinc?
   a. Meat, poultry and fish
   b. Milk and daily products
   c. Fruits
   d. Grain products such as bread, cereal, and rice
   e. Don’t know

4. Cholesterol is found in ______.
   a. Vegetables and vegetables oils
   b. All foods containing fat or oil
   c. Animal products like meat and dairy
   d. None of above
   e. Don’t know

5. If you eat 2000 calories a day, your daily sodium intake should be less than how many milligrams?
   a. 500mg
   b. 2400mg
   c. 4300mg
   d. 6000mg
   e. Don’t know

6. Which food group is our body's best source of energy?
   a. Meat Group
   b. Fats, oils and sweets
   c. Breads and cereals
   d. Milk and cheese
   e. Don’t know

7. Which of the following is not considered a nutrient?
   a. Vitamins
   b. Minerals
   c. Fiber
   d. Fats
   e. Don’t know
8. Which of the following is added to a food label because people sometimes don’t eat enough of this?
   a. Fat  
   b. Calcium  
   c. Sodium  
   d. Cholesterol  
   e. Don’t know

9. The bread, cereal, rice and pasta group is a good source of _______.
   a. Carbohydrate  
   b. Vitamin C  
   c. Calcium  
   d. Vitamin D  
   e. Don’t know

10. Which of the following is required on a food label?
    a. Total carbohydrate  
    b. Sugars  
    c. Iron  
    d. All of the above  
    e. Don’t know

11. Citrus fruits are an excellent source of _______.
    a. Calcium  
    b. Vitamin C  
    c. Vitamin B  
    d. Calories  
    e. Don’t know

12. Foods as the meat, poultry, fish, dry beans, eggs and nuts are an important source of _______.
    a. Iron  
    b. Fiber  
    c. Beta carotene  
    d. Calcium  
    e. Don’t know

13. In general, which food contains the most fat?
    a. Graham crackers  
    b. Brownies  
    c. Pudding  
    d. Angel food cake  
    e. Don’t know

14. The milk, cheese and yogurt group are important for _______.
    a. Strong bones  
    b. Teeth  
    c. Muscles  
    d. All of the above  
    e. Don’t know

15. How many servings of vegetables do we need each day?
    a. 1-2  
    b. 2-3  
    c. 3-5  
    d. 6-11  
    e. Don’t know
Section IV: Individual Characteristics

The following questions are asking about your general personal characteristics. Please answer based on your personality.

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. In general, I am interested in looking for nutritional information of menu items in a restaurant.</td>
<td>1------2---------3--------4------5</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>2. I would like to receive additional nutritional information about menu items in a restaurant.</td>
<td>1------2---------3--------4------5</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>3. In general, I intend to pay attention to nutritional information while choosing a menu item in a restaurant.</td>
<td>1------2---------3--------4------5</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>4. It is important to me that nutritional information is available on the menu.</td>
<td>1------2---------3--------4------5</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>5. I usually ignore nutritional information while choosing a menu item in a restaurant.</td>
<td>1------2---------3--------4------5</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>6. I am quite knowledgeable about nutritional information compared to most people.</td>
<td>1------2---------3--------4------5</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>7. I am confident in using nutritional information compared to most people.</td>
<td>1------2---------3--------4------5</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>8. I feel confident about my ability to comprehend nutritional information on the menu.</td>
<td>1------2---------3--------4------5</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>9. I will look for nutritional information of menu items in a restaurant in future.</td>
<td>1------2---------3--------4------5</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>10. I will ask additional nutritional information about menu items to a server in a restaurant in future.</td>
<td>1------2---------3--------4------5</td>
<td>Strongly Agree</td>
</tr>
<tr>
<td>11. I will pay more attention to nutritional information while choosing a menu item at a restaurant in future.</td>
<td>1------2---------3--------4------5</td>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

The following questions are asking about your health Status.

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Disagree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Overall, current my health status is _______</td>
<td>1------2---------3--------4------5</td>
<td>Excellent</td>
</tr>
<tr>
<td>2. How serious have your health problems been?</td>
<td>1------2---------3--------4------5</td>
<td>Very Serious</td>
</tr>
</tbody>
</table>
Section V: Demographic Questions

The following questions are general questions about you.

1. Please select the major information source that you use to obtain the nutritional information of menu items offered by restaurant from the following. (Please select only one).
   a. TV  b. Restaurant Website  c. Other Website (ex. Yahoo, Google)
   d. Newspaper  e. Menu  f. Ask to a server
g. Others

2. How many times do you eat at a restaurant during a week?
   a. 0  b. 1-2  c. 3-4  d. 5-6  e. more than 7

3. How often do you eat at a fast food restaurant during a week?
   a. 0  b. 1-2  c. 3-4  d. 5-6  e. more than 7

4. Please indicate your gender.
   a. Male  b. Female

5. Please indicate your age.
   a. 18-20 years old  b. 21-23 years old  c. 24-26 years old
   d. 27-30 years old  e. 31-35 years old  f. More than 35 years old

6. Please indicate which of the following best describe your status.
   a. Freshman  b. Sophomore  c. Junior
   d. Senior  e. Graduate  f. Faculty or Staff

7. Please indicate your ethnicity/nationality.
   a. Caucasian  b. African American  c. Hispanic
   d. Asian  e. Native American  f. Other (       )

8. Please indicate your monthly income.
   a. Under $1,000  b. $1,001 - $2,000  c. $2,001 - $3,000
   d. $3,001 - $5,000  e. $5,001 - $7,000  f. Over $7,000

9. Please indicate your monthly expenditure on food away from home.
   a. Under $100  b. $100 - $200  c. $201 - $300
   d. $301 - $400  e. $401 - $500  f. Over $500

Thank you very much for your participation!
Appendix C: Examples of Menu
• Menu including a Healthy Target Item in Healthy Context without Nutritional Information

**MENU**

♦ **Italian Chicken Sandwich**  
Grilled, marinated chicken breast topped with sliced portobello mushrooms, a slice of tomato and chunky marinara sauce.

♦ **Lemon Herb Roasted Chicken**  
Roasted half-chicken seasoned with a Light Lemon Garlic-Herb Sauce.

♦ **Grilled Chicken**  
Grilled chicken breasts in an apricot citrus sauce. Served with broccoli, asparagus and diced tomatoes.

• Menu including a Healthy Target Item in Unhealthy Context without Nutritional Information

**MENU**

♦ **Chicken Caesar Salad**  
Grilled chicken served on top of romaine lettuce in a creamy and garlicky Caesar dressing topped with parmesan cheese and croutons.

♦ **Lemon Herb Roasted Chicken**  
Roasted half-chicken seasoned with a Light Lemon Garlic-Herb Sauce.

♦ **Chicken Marsala**  
Sautéed chicken breasts in a savory sauce of mushrooms, garlic and marsala wine.
• Menu including a Unhealthy Target Item in Healthy Context without Nutritional Information

**MENU**

♦ **Italian Chicken Sandwich**  
Grilled, marinated chicken breast topped with sliced portobello mushrooms, a slice of tomato and chunky marinara sauce.

♦ **Chicken Fajitas**  
Juicy chicken served on a skillet that sizzles like the Southwest sun. Served with southwest rice, guacamole, sour cream, pico de gallo, caramelized onions, green peppers and Jack-cheddar cheese.

♦ **Grilled Chicken**  
Grilled chicken breasts in an apricot citrus sauce. Served with broccoli, asparagus and diced tomatoes.

• Menu including a Unhealthy Target Item in Unhealthy Context without Nutritional Information

**MENU**

♦ **Chicken Caesar Salad**  
Grilled chicken served on top of romaine lettuce in a creamy and garlicky Caesar dressing topped with parmesan cheese and croutons.

♦ **Chicken Fajitas**  
Juicy chicken served on a skillet that sizzles like the Southwest sun. Served with southwest rice, guacamole, sour cream, pico de gallo, caramelized onions, green peppers and Jack-cheddar cheese.

♦ **Chicken Marsala**  
Sautéed chicken breasts in a savory sauce of mushrooms, garlic and marsala wine.
• Menu including a Healthy Target Item in Healthy Context with Calories

**Menu**

- **Italian Chicken Sandwich**
  Grilled, marinated chicken breast topped with sliced portobello mushrooms, a slice of tomato and chunky marinara sauce. (360 Calories)

- **Lemon Herb Roasted Chicken**
  Roasted half–chicken seasoned with a Light Lemon Garlic-Herb Sauce. (420 Calories)

- **Grilled Chicken**
  Grilled chicken breasts in an apricot citrus sauce. Served with broccoli, asparagus and diced tomatoes. (340 Calories)

• Menu including a Healthy Target Item in Unhealthy Context with Calories

**Menu**

- **Chicken Caesar Salad**
  Grilled chicken served on top of romaine lettuce in a creamy and garlicky Caesar dressing topped with parmesan cheese and croutons. (900 Calories)

- **Lemon Herb Roasted Chicken**
  Roasted half–chicken seasoned with a Light Lemon Garlic-Herb Sauce. (420 Calories)

- **Chicken Marsala**
  Sautéed chicken breasts in a savory sauce of mushrooms, garlic and marsala wine. (920 Calories)
- Menu including a Unhealthy Target Item in Healthy Context with Calories

**ITALIAN CHICKEN SANDWICH**
Grilled, marinated chicken breast topped with sliced portobello mushrooms, a slice of tomato and chunky marinara sauce. (360 Calories)

**CHICKEN FAJITAS**
Juicy chicken served on a skillet that sizzles like the Southwest sun. Served with southwest rice, guacamole, sour cream, pico de gallo, caramelized onions, green peppers and Jack-cheddar cheese. (830 Calories)

**GRILLED CHICKEN**
Grilled chicken breasts in an apricot citrus sauce. Served with broccoli, asparagus and diced tomatoes. (340 Calories)

- Menu including a Unhealthy Target Item in Unhealthy Context with Calories

**CHICKEN CAESAR SALAD**
Grilled chicken served on top of romaine lettuce in a creamy and garlicky Caesar dressing topped with parmesan cheese and croutons. (900 Calories)

**CHICKEN FAJITAS**
Juicy chicken served on a skillet that sizzles like the Southwest sun. Served with southwest rice, guacamole, sour cream, pico de gallo, caramelized onions, green peppers and Jack-cheddar cheese. (830 Calories)

**CHICKEN MARSALA**
Sautéed chicken breasts in a savory sauce of mushrooms, garlic and marsala wine. (920 Calories)
- Menu including a Healthy Target Item in the Healthy Context with Nutritional Information of 6 nutrition contents

<table>
<thead>
<tr>
<th><strong>Italian Chicken Sandwich</strong></th>
<th>Grilled, marinated chicken breast topped with sliced portobello mushrooms, a slice of tomato and chunky marinara sauce.</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>360 Calories</em></td>
<td>6.5g Total Fat (10% DV)</td>
</tr>
<tr>
<td><em>36mg Cholesterol (12% DV)</em></td>
<td>264mg Sodium (11% DV)</td>
</tr>
<tr>
<td><em>2g Saturated Fat (10% DV)</em></td>
<td>34g Protein (68% DV)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Lemon Herb Roasted Chicken</strong></th>
<th>Roasted half-chicken seasoned with a Light Lemon Garlic-Herb Sauce.</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>420 Calories</em></td>
<td>9g Total Fat (14% DV)</td>
</tr>
<tr>
<td><em>45mg Cholesterol (15% DV)</em></td>
<td>384mg Sodium (16% DV)</td>
</tr>
<tr>
<td><em>3g Saturated Fat (15% DV)</em></td>
<td>31g Protein (62% DV)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Grilled Chicken</strong></th>
<th>Grilled chicken breasts in an apricot citrus sauce. Served with broccoli, asparagus and diced tomatoes.</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>340 Calories</em></td>
<td>5.2g Total Fat (8% DV)</td>
</tr>
<tr>
<td><em>24mg Cholesterol (8% DV)</em></td>
<td>216mg Sodium (9% DV)</td>
</tr>
<tr>
<td><em>1.4g Saturated Fat (7% DV)</em></td>
<td>36g Protein (72% DV)</td>
</tr>
</tbody>
</table>

*Percent Daily Values (DV) are based on a 2,000 calorie diet.

- Menu including a Healthy Target Item in the Unhealthy Context with Nutritional Information of 6 nutrition contents

<table>
<thead>
<tr>
<th><strong>Chicken Caesar Salad</strong></th>
<th>Grilled chicken served on top of romaine lettuce in a creamy and garlicky Caesar dressing topped with parmesan cheese and croutons.</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>900 Calories</em></td>
<td>43g Total Fat (66% DV)</td>
</tr>
<tr>
<td><em>201mg Cholesterol (67% DV)</em></td>
<td>1560mg Sodium (65% DV)</td>
</tr>
<tr>
<td><em>13g Saturated Fat (65% DV)</em></td>
<td>13g Protein (26% DV)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Lemon Herb Roasted Chicken</strong></th>
<th>Roasted half-chicken seasoned with a Light Lemon Garlic-Herb Sauce.</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>420 Calories</em></td>
<td>9g Total Fat (14% DV)</td>
</tr>
<tr>
<td><em>45mg Cholesterol (15% DV)</em></td>
<td>384mg Sodium (16% DV)</td>
</tr>
<tr>
<td><em>3g Saturated Fat (15% DV)</em></td>
<td>31g Protein (62% DV)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Chicken Marsala</strong></th>
<th>Sautéed chicken breasts in a savory sauce of mushrooms, garlic and marsala wine.</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>920 Calories</em></td>
<td>46g Total Fat (71% DV)</td>
</tr>
<tr>
<td><em>216mg Cholesterol (72% DV)</em></td>
<td>1680mg Sodium (70% DV)</td>
</tr>
<tr>
<td><em>15g Saturated Fat (75% DV)</em></td>
<td>10g Protein (20% DV)</td>
</tr>
</tbody>
</table>

*Percent Daily Values (DV) are based on a 2,000 calorie diet.
- Menu including a Unhealthy Target Item in the Healthy Context with Nutritional Information of 6 nutrition contents

![Menu Image 1](image1)

- Menu including a Unhealthy Target Item in the Unhealthy Context with Nutritional Information of 6 nutrition contents

![Menu Image 2](image2)
Appendix D: Results of Additional Multiple Regression Analysis
(Dependent Variable: Source Credibility)
### Table D.1: Results of Regression Analysis Result: Effect of Nutritional Knowledge on Source Credibility

<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Model I</th>
<th>Model II</th>
<th>Model III</th>
<th>Model IV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
</tr>
<tr>
<td>Constant</td>
<td>3.63 (0.10)***</td>
<td>3.63 (0.13)***</td>
<td>3.60 (0.10)***</td>
<td>3.60 (0.10)***</td>
</tr>
<tr>
<td>Target Item</td>
<td>-0.03 (0.09)</td>
<td>-0.03 (0.09)</td>
<td>-0.01 (0.09)</td>
<td>-0.01 (0.09)</td>
</tr>
<tr>
<td>Context</td>
<td>-0.09 (0.09)</td>
<td>-0.09 (0.09)</td>
<td>-0.08 (0.09)</td>
<td>-0.08 (0.09)</td>
</tr>
<tr>
<td>Total Calories</td>
<td>-0.03 (0.11)</td>
<td>-0.03 (0.11)</td>
<td>-0.004 (0.11)</td>
<td>0.002 (0.11)</td>
</tr>
<tr>
<td>Nutritional Info of 6 contents</td>
<td>-0.01 (0.11)</td>
<td>-0.01 (0.11)</td>
<td>0.02 (0.11)</td>
<td>0.02 (0.11)</td>
</tr>
<tr>
<td>Objective NK (CONK)</td>
<td>0.05 (0.02)***</td>
<td>0.06 (0.03)*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Subjective NK (CSNK)</td>
<td></td>
<td></td>
<td>0.09 (0.05)*</td>
<td>0.02 (0.09)</td>
</tr>
<tr>
<td>Cal*CONK</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NI*CONK</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cal*CSNK</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NI*CSNK</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.005</td>
<td>0.07</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Model fit (F-Value)</td>
<td>1.29</td>
<td>0.94</td>
<td>0.86</td>
<td>0.77</td>
</tr>
<tr>
<td>R² Change</td>
<td></td>
<td>&lt;0.001</td>
<td></td>
<td>0.004</td>
</tr>
<tr>
<td>F Change</td>
<td></td>
<td>0.07</td>
<td></td>
<td>0.60</td>
</tr>
</tbody>
</table>

Note: *Significant at p<0.1; **Significant at p<0.05; ***Significant at p<0.01.
Standard errors are in the parentheses.
<table>
<thead>
<tr>
<th>Independent Variables</th>
<th>Overall Food Attitude</th>
<th>Purchase Intention</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B (S.E.)</td>
<td>B (S.E.)</td>
</tr>
<tr>
<td>Constant</td>
<td>4.26 (0.13)***</td>
<td>4.27 (0.15)***</td>
</tr>
<tr>
<td>Target Item</td>
<td>0.11 (0.11)</td>
<td>0.04 (0.13)</td>
</tr>
<tr>
<td>Context</td>
<td>-0.46 (0.11)***</td>
<td>-0.58 (0.13)***</td>
</tr>
<tr>
<td>Total Calories</td>
<td>-0.34 (0.14)**</td>
<td>-0.41 (0.16)**</td>
</tr>
<tr>
<td>Nutritional Info of 6 contents</td>
<td>-0.43 (0.14)***</td>
<td>-0.49 (0.16)***</td>
</tr>
<tr>
<td>Motivation (CMOT)</td>
<td>-0.04 (0.06)</td>
<td>-0.05 (0.07)</td>
</tr>
<tr>
<td>Objective NK (CONK)</td>
<td>0.003 (0.02)</td>
<td>&lt;0.001 (0.03)</td>
</tr>
<tr>
<td>Subjective NK (CSNK)</td>
<td>0.04 (0.07)</td>
<td>0.08 (0.09)</td>
</tr>
<tr>
<td>CMOT*CONK</td>
<td>0.004 (0.02)</td>
<td>-0.002 (0.03)</td>
</tr>
<tr>
<td>CMOT*CSNK</td>
<td>-0.12 (0.05)**</td>
<td>-0.13 (0.06)**</td>
</tr>
<tr>
<td>Adj. R²</td>
<td>0.08</td>
<td>0.08</td>
</tr>
<tr>
<td>Model fit (F-Value)</td>
<td>3.94**</td>
<td>4.13***</td>
</tr>
</tbody>
</table>

Note: *Significant at p<0.1; **Significant at p<0.05; ***Significant at p<0.01. Standard errors are in the parentheses.

Table D.2: Results of Regression Analysis: Interaction Effect b/w Nutritional Knowledge and Motivation to Process
Appendix E: Objective Nutritional Knowledge Questions
### Objective Nutritional Knowledge Question

<table>
<thead>
<tr>
<th>Question</th>
<th>Correct</th>
<th>“Don’t Know”</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Which kind of fat is higher in calories?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Saturated fats</td>
<td>18</td>
<td>78</td>
</tr>
<tr>
<td>b. Polyunsaturated fats</td>
<td>(5.6%)</td>
<td>(24.5%)</td>
</tr>
<tr>
<td>c. They are both the same</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. None of the above</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Don’t know</td>
<td>18</td>
<td>78</td>
</tr>
<tr>
<td>2. Risk of high blood pressure is most likely to be reduced by eating a diet with _____</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Less sugar</td>
<td>188</td>
<td>62</td>
</tr>
<tr>
<td>b. More fiber</td>
<td>(58.9%)</td>
<td>(19.4%)</td>
</tr>
<tr>
<td>c. More iron</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Less salt</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Don’t know</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Which food group provides protein, B vitamins, iron, and zinc?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Meat, poultry and fish</td>
<td>234</td>
<td>41</td>
</tr>
<tr>
<td>b. Milk and daily products</td>
<td>(73.4%)</td>
<td>(12.9%)</td>
</tr>
<tr>
<td>c. Fruits</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Grain products such as bread, cereal, and rice</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Don’t Know</td>
<td>234</td>
<td>41</td>
</tr>
<tr>
<td>4. Cholesterol is found in _____</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Vegetables and vegetables oils</td>
<td>103</td>
<td>52</td>
</tr>
<tr>
<td>b. All foods containing fat or oil</td>
<td>(32.3%)</td>
<td>(16.3%)</td>
</tr>
<tr>
<td>c. Animal products like meat and dairy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. None of above</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Don’t know</td>
<td>103</td>
<td>52</td>
</tr>
<tr>
<td>5. If you eat 2000 calories a day, your daily sodium intake should be less than how many milligrams?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. 500mg</td>
<td>48</td>
<td>225</td>
</tr>
<tr>
<td>b. <strong>2400mg</strong></td>
<td>(15.0%)</td>
<td>(70.5%)</td>
</tr>
<tr>
<td>c. 4300mg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. 6000mg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Don’t know</td>
<td>48</td>
<td>225</td>
</tr>
<tr>
<td>6. Which food group is our body's best source of energy?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Meat Group</td>
<td>183</td>
<td>23</td>
</tr>
<tr>
<td>b. Fats, oils and sweets</td>
<td>(57.4%)</td>
<td>(7.2%)</td>
</tr>
<tr>
<td>c. Breads and cereals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Milk and cheese</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Don’t know</td>
<td>183</td>
<td>23</td>
</tr>
<tr>
<td>7. Which of the following is not considered a nutrient?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Vitamins</td>
<td>82</td>
<td>46</td>
</tr>
<tr>
<td>b. Minerals</td>
<td>(25.7%)</td>
<td>(14.4%)</td>
</tr>
<tr>
<td>c. Fiber</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Fats</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Don’t know</td>
<td>82</td>
<td>46</td>
</tr>
</tbody>
</table>

Note: The correct answer is in bold.

Table E.1: Frequency of Correct Answers of Objective Nutritional Knowledge Questions
Table E.1 continued

| 8. Which of the following is added to a food label because people sometimes don’t eat enough of this? |
|-----------------------------------------------|-------------------------------------------------|------|--------|
| a. Fat                                      | b. **Calcium**                                  | 251  | 45     |
| c. Sodium                                   | d. Cholesterol                                  | (78.7%) | (14.1%)|
| e. Don’t know                                |                                                 |      |        |

| 9. The bread, cereal, rice and pasta group is a good source of _____. |
|-------------------------------------------------------------------------|--------------------------------------------------|------|--------|
| a. **Carbohydrate**                                                     | b. Vitamin C                                     | 304  | 6      |
| c. Calcium                                                               | d. Vitamin D                                     | (95.3%) | (1.9%)|
| e. Don’t know                                                            |                                                 |      |        |

| 10. Which of the following is required on a food label?                   |
|---------------------------------------------------------------|--------------------------------------------------|------|--------|
| a. Total carbohydrate                                        | b. Sugars                                        | 215  | 39     |
| c. Iron                                                      | **d. All of the above**                          | (67.4%) | (12.2%)|
| e. Don’t know                                                |                                                 |      |        |

| 11. Citrus fruits are an excellent source of __________.            |
|---------------------------------------------------------------|--------------------------------------------------|------|--------|
| a. Calcium                                                   | b. **Vitamin C**                                  | 300  | 14     |
| c. Vitamin B                                                 | d. Calories                                      | (94.0%) | (4.4%)|
| e. Don’t know                                                |                                                 |      |        |

| 12. Foods as the meat, poultry, fish, dry beans, eggs and nuts are an important source of _____. |
|-----------------------------------------------------------------------------------------------|--------------------------------------------------|------|--------|
| a. **Iron**                                                                                  | b. Fiber                                         | 151  | 87     |
| c. Beta carotene                                                                             | d. Calcium                                       | (47.3%) | (27.3%)|
| e. Don’t know                                                                                |                                                 |      |        |

| 13. In general, which food contains the most fat?                                    |
|------------------------------------------------------------------------------------------|--------------------------------------------------|------|--------|
| a. Graham crackers                                                                       | b. **Brownies**                                  | 170  | 76     |
| c. Pudding                                                                                | d. Angel food cake                               | (53.3%) | (23.8%)|
| e. Don’t know                                                                             |                                                 |      |        |

| 14. The milk, cheese and yogurt group are important for _____.                         |
|------------------------------------------------------------------------------------------|--------------------------------------------------|------|--------|
| a. Strong bones                                                                           | b. Teeth                                         | 220  | 8      |
| c. Muscles                                                                                | **d. All of the above**                          | (69.0%) | (2.5%)|
| e. Don’t know                                                                             |                                                 |      |        |

| 15. How many servings of vegetables do we need each day?                                |
|------------------------------------------------------------------------------------------|--------------------------------------------------|------|--------|
| a. 1-2                                                                                    | b. **2-3**                                       | 141  | 41     |
| c. 3-5                                                                                    | d. 6-11                                          | (44.2%) | (12.9%)|
| e. Don’t know                                                                             |                                                 |      |        |