

FACTORS INFLUENCING THE PERCEIVED CREDIBILITY OF DIET-NUTRITION
INFORMATION WEB SITES

By

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To my supportive and beloved family

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Abstract of Thesis Presented to the Graduate School
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Many people are concerned with diet and nutrition because they are strongly correlated with overall health. To ensure that online information can help educate consumers about diet and nutrition, the perception of online information credibility has been emphasized. In this context, the purpose of the present study is to investigate the factors that impact the perceived credibility of online diet and nutrition information.

By employing the elaboration likelihood model (ELM) to explain how users process online diet and nutrition messages, this study suggests factors that may influence Web site credibility. In view of that theoretical background, this study examines how source expertise and message accuracy influence the perceived credibility of online health information. In this sense, the literature review discusses why people go online to obtain diet and nutrition information and assesses the importance of online information credibility.

An online experiment was conducted with 374 undergraduate students. The first research question asked whether there is a relationship among source expertise, message accuracy, and the perceived credibility of Web sites providing diet and nutrition information. The result of a Pearson's correlation analysis showed that perceived Web site credibility was positively and significantly correlated with source expertise and message accuracy.

Hypothesis 1 and 2 predicted interaction effects between source expertise and message accuracy. The two-way ANOVA results indicated no significant interaction effect between source expertise and message accuracy on perceived Web site credibility, and therefore, Hypotheses 1 and 2 were not supported. However, there were statistically significant main effects of source expertise and message accuracy on perceived Web site credibility.

H3 and H4 assumed that issue involvement will influence the impact of source expertise and message accuracy on perceived Website credibility. An ANCOVA was conducted, using involvement as the co-variate and the result revealed that issue involvement had a significant main effect on perceived Web site credibility. Based on these results, a two-way ANOVA was conducted to examine the relationship between involvement and source expertise, and involvement and message accuracy, separately. As a result, there was no significant interaction effect of issue involvement and source expertise, but there was a significant interaction effect between issue involvement and message accuracy. This analysis showed that message accuracy had a greater impact on perceived Web site credibility for highly involved participants ($M= 4.17$) than for low involvement participants. Therefore, hypothesis 3 was rejected but hypothesis 4 was supported.

From these findings, this study will contribute to our understanding of the factors that affect the ways people process online diet and nutrition information. The results of this study could also help practitioners, such as health professionals and educators, understand the importance of sources of information and related user behavior (Kenkel, 1990; Nayga, 2000; Pauly & Satterthwaite, 1981).

CHAPTER 1 INTRODUCTION

With the advent of new technology, people are now paying more attention to science-based health information. In particular, many people are concerned about eating-related issues, including diet and nutrition information, because many diseases are caused primarily by poor eating habits (Glanz, Basil, Maibach, & Goldberg, 1998). Most of all, obesity has become a serious health problem, especially in Western countries (Madden & Chamberlain, 2004). People who are obese—people with an abnormally high and unhealthy proportion of body fat—are at increased risk of developing a number of adverse health conditions (National Cancer Institute, 2004). Obesity is related to many life-threatening diseases such as “diabetes mellitus, cardiovascular disease, hypertension, and certain cancers” and is associated “with increased risk of disability and a modestly elevated risk of all-cause mortality” (Centers for Disease Control, 2007, p.1).

To examine this issue, the Centers for Disease Control (CDC) investigated obesity trends among U.S. adults from 1985 to 2008 and reported that the rate of obesity has increased dramatically during the past 20 years. In 2008, 20% of the population was found to be obese in all states except one, Colorado. Moreover, the rate of obesity in six states (i.e. Alabama, Mississippi, Oklahoma, South Carolina, Tennessee, and West Virginia) was equal to or greater than 30% of the whole population. Based on these results, the CDC views obesity as an epidemic (Harrison & Marske, 2005).

In addition, according to Reuters, approximately \$147 billion a year, nearly 10 percent of all medical costs in the United States, is spent on the treatment of obesity-related diseases. In other words, the CDC reported that the increase in U.S. obesity rates (up from 37 percent in 1998) has led to an 89 percent increase in spending on treatments for obesity-related diseases

such as diabetes, heart disease and arthritis (CDC, 2006). Notably, obesity results in a loss of self-esteem as well as diseases such as cancer, diabetes, stroke, and so on (Madden & Chamberlain, 2004). Approximately 60% of adults in the U.S. are overweight, which increases the risk of developing diabetes and certain forms of cancer (Mokdad, Serdula, Dietz, Bowman, Marks, & Koplan, 1999; Must, Spadano, Coakley, Field, Colditz, & Dietz, 1999; Neuhauser & Kreps, 2003). Based on this, obesity is clearly a threat to people's physiological well-being and a drain on financial resources. Thus, in order to curtail the negative effects of obesity, people need to become more aware of the lifestyle and nutritional factors that contribute to obesity and obesity-related diseases, and they need to be equipped with the right tools and information to understand their health status accurately.

Although the cause of obesity is associated with a wide range of complex factors, the National Cancer Institute (NCI) has demonstrated that overconsumption of high-calorie foods plays a primary role in the obesity epidemic. Therefore, to avoid weight gain and lower the risk of developing obesity-related diseases such as diabetes and cancers, people need to learn ways of controlling their dietary habits or caloric intake (NCI, 2004). With regard to the issue of dietary habits, Glanz, Basil, Maibach, and Goldberg (1998) have suggested that one reason many Americans are overweight is a lack of understanding of what constitutes a healthy diet. Thus, people need access to appropriate diet and nutrition information, which could help stem the obesity epidemic (Ayoob, Duyff, & Quagliani, 2002).

In the past, people often have obtained diet and nutrition information from mass media, such as television, radio, magazines, and so on. Today, people tend to seek such information online because the Internet provides quick, easy, and on-demand access (Liszka, Steyer, & Hueston, 2006). However, people are sometimes confused by the information they find online

simply because of the overwhelming volume of data the Internet provides (Harper, 1988). This characteristic causes people to wonder whether the information they find online is indeed correct (Abbott, 1997; Sankofa & Johnson-Taylor, 2007).

Despite this problem, the Pew Internet & American Life Project in 2008 found that more than 60% of Internet users not only seek health information online but also tend to be influenced by the online health information they read. Likewise, the Internet has the potential to influence health knowledge by providing audiences with useful information, which may play an essential role in determining users' treatment of their illness or condition (Evers, Prochaska, Prochaska, Driskell, Cummins, & Velicer, 2009). Although studies have shown that people tend to prefer to seek counsel from their own doctors regarding health problems, the Internet, nonetheless, now functions as "the first channel of information consulted" (Eysenbach, 2008, p.125). For example, in a study conducted by Nicola, Jonathan, Klein, Noyce, Sesselberg, and Cantrill (2005), the findings showed that consumers are used to employing the Internet to find health-related information, ranging from information about relatively minor health problems such as plantar warts to serious diseases such as cancer. In addition, Health Information National Trends Survey (HINTS) have investigated Internet use in seeking health information and found that the number of people who use the Internet to seek health information has been increasing. Specifically, people who looked for health or medical information for yourself via Internet in 2005 (58.39%) outnumbered those in 2003 (50.55%). This suggests that the convenience of accessing online information supersedes visiting a doctor in terms of satisfying people's desire to obtain as much information as possible to assist with understanding their health problems. On this note, many health professionals also have suggested that the Internet helps users gather health information

by providing consumers with useful knowledge about health-related issues (Neuhauser & Kreps, 2003).

The ability to search for information online has led to a rapid increase in both information seekers and providers. As a result, the Internet could play an essential role in helping to educate people about diet and nutrition. Moreover, understanding how users perceive this information is crucial (Eastin, 2001; Pew Internet & American Life Project, 2000). In this context, studies about online health information have become particularly important because research indicates that individuals indeed use what they learn online to make health-related decisions for themselves and their loved ones (Kreps & Kunimoto, 1994).

However, to ensure that online information can help educate consumers about diet and nutrition, the perception of online information credibility has been emphasized (Eastin, 2001; Eysenbach, 2008; Freeman & Spyridakis, 2004). Previous studies have suggested that credibility is a significant influence on users' perceptions of health-related messages and their behavioral responses to those messages (Dutta-Bergman, 2004; Eastin, 2001; Harris, Sillence, & Briggs, 2009). Although many studies have examined the factors that contribute to the perceived credibility of online diet and nutrition information, the relationship of credibility with message features and source cues has not been investigated comprehensively (Hong, 2006). To fill this gap in online health communication research, this study will investigate the impact of two key factors that may influence how people determine the credibility of online health information.

In order to explain the factors that impact the perceived credibility of online diet and nutrition information, the elaboration likelihood model (ELM) is employed. The ELM focuses on message processing and holds that people may process information using either a central or peripheral route (Flanagin & Metzger, 2000). In view of that theoretical background, this study

examines how source expertise and message accuracy influence the perceived credibility of online health information.

To put this issue into perspective, we must first learn why understanding diet and nutrition is so important to the improvement of public health. Thus, the literature review discusses why people go online to obtain diet and nutrition information and assesses the importance of online information credibility. Further, by employing the ELM to explain how users process online diet and nutrition messages, this study suggests factors that may influence Web site credibility. Therefore, this study will contribute to our understanding of the factors that affect the ways people process online diet and nutrition information. The results of this study could also help practitioners, such as health professionals and educators, understand the importance of sources of information and related user behavior (Kenkel, 1990; Nayga, 2000; Pauly & Satterthwaite, 1981).

In this context, this document proceeds as follows: Chapter 2 describes the importance of diet and nutrition information. In addition, this chapter explains the advantages and disadvantages of using the Internet as a health-related information resource and discusses how various factors influence perceptions of online information credibility. Drawing on previous studies, it also provides the rationale for using the Elaboration Likelihood Model (ELM) as the underpinning for the study. Lastly, it states the research questions and hypotheses that inform this study. The methods used in this research project are discussed in Chapter 3. Chapter 4 provides the results of the study, and Chapter 5 consists of a discussion of the findings, their implications for diet and nutrition communicators, and suggestions for further research, as well as discussing limitations of the study.

CHAPTER 2 LITERATURE REVIEW

The Importance of Diet and Nutrition Information

Diet is defined as an individual's regular pattern of consumption of food and drink for nourishment purposes (Griggs, 1988; Newman, 1986; Qandt & Ritenbaugh, 1986). Many people are concerned with diet and nutrition because they are strongly correlated with overall health (Lindeman, Keskivaara, & Roschier, 2000). The American Dietetic Association (ADA) reported that approximately three in five consumers (67%) consider diet and nutrition to be very important (*Nutrition and You: Trends survey*, 2008). In addition, Madden and Chamberlain (2004) note that food and its consumption are involved not only in alleviating hunger but in causing dietary diseases as well. Poor dietary habits not only cause diseases, such as obesity and diabetes, but they contribute significantly to the cost of health care (Leichter, 1999).

In particular, because obesity can cause life-threatening diseases, it is regarded as a major problem, typically associated with poor dietary habits (Charlton, Brewitt, & Bourne, 2004; Harrison & Marske, 2005; Madden & Chamberlain, 2004). Thus, people should understand that diet and nutrition are important in helping to control body weight and that maintaining a healthy diet is crucial. This concern about dietary health explains the need for people to have access to accurate information related to diet and nutrition.

In order to obtain diet and nutrition information, people have consulted many sources, including individual counseling provided by health professionals, mass media, health education materials, and others (Charlton, Brewitt, & Bourne, 2004). Of these sources, people tend to prefer face-to-face communication with health professionals, including dietitians, doctors, and nurses (Freeland-Graves & Nitzke, 2002). Although interpersonal communication is considered a reliable source from which to obtain information related to health, there are some limitations

regarding delivering health information to people through interpersonal contact. First, to receive information this way, consumers must take the time to meet with a health professional and must pay for the medical service they receive, and many consumers are unwilling to seek health professionals' advice on diet. For example, although Americans spend tens of billions of dollars annually on weight loss products, fewer than half of obese patients have been treated by qualified professionals (Ayoob, Duyff, & Quagliani, 2002; Colditz, 1999; Galuska, Will, Serdula, & Ford, 1999). Instead, people tend to use public information provided by the media. Therefore, media play an essential role in delivering the information necessary to help achieve the common goal of public health (Neuhauser & Kreps, 2003).

Many studies have revealed that media conduits play a key role in delivering information about diet and nutrition, especially because people have such easy access to that information. For example, the American Dietetic Association reported that the media are the primary providers of nutrition information (Sankofa & Johnson-Taylor, 2007). Ayoob, Duyff and Quagliani (2002) emphasized the role of media in disseminating information about nutrition, food, and food safety issues. Moreover, they suggested that diet and nutrition messages provided by health professionals through the media are not only more persuasive for audiences but that the information media provide is also easier to use (Ayoob, Duyff, & Quagliani, 2002; Charlton, Brewitt, & Bourne, 2004). This holds true outside the United States as well; Holgado, Martinez-Gozalez, Irala-Extevez, Gibney, Kearney, and Martinez (1999) confirmed that mass media in the United Kingdom have been the main actors in delivering messages related to healthy eating and nutrition to the public.

Online Diet-Nutrition Communication

Nowadays, people who have health concerns can search for relevant information via the media, especially the Internet. Before the Internet emerged, several studies were conducted on

individuals' use of health information obtained through traditional mass media, such as TV, radio, and magazines. In particular, the effect of messages from broadcast media, namely television, has been investigated for many years (Marcus, Owen, Forsyth, Cavin, & Fridinger, 1998). For example, Dietz and Gortmaker (1985) found that television viewing is strongly related with children's risk of obesity, and Hancox, Milne, and Poulton (2004) also demonstrated that television consumption has an influence on obesity, for several reasons. Television viewing influences food purchases and therefore is correlated with consumption of foods advertised on television (Dussere, 1976). In particular, calorically dense foods such as chocolate, candy, and cookies advertised on television contribute to the obesity epidemic (Clancy-Hepburn, Hickey, Nevill, 1974). Also, an increase in the amount of time spent watching television is connected to a reduction in the amount of time spent in energy-expending activities because people expend little energy in watching television (Galst & White, 1976). Therefore, it seems likely that the increased amount of time spent watching television has a significant relationship with obesity.

In addition to the research focused on the effects of television watching, studies have shown that consumers' understanding of diet and nutrition information and their food choices tend to be based on how food is described on TV (Harrison & Marske, 2005). For example, Dixon, Scully, Wakefield, White, and Crawford (2007) examined the effect of TV advertisements for foods on children's dietary knowledge, attitudes and intentions, and found that heavier TV use and more frequent viewing of TV ads were related to more positive attitudes toward foods that were presented on TV. Consistent with this argument, Morley, Wakefield, Dunlop, and Hill (2009) conducted an experiment using commercial television programs delivering obesity and cancer information. Their study showed that the mass media campaign increased awareness of the link between weight gain and cancer.

Although traditional mass media conduits have been consumers' primary sources for information for a long time, the Internet now provides an important additional source of information (Marcus, Owen, Forsyth, Cavil, & Fridinger, 1998). In particular, online media features (i.e., mass customization, interactivity, and convenience) have boosted online health communication in the digital era (Neuhauser & Kreps, 2003). In other words, people actively seek information related to diet and nutrition, and their desire for that information leads them to search online. Specifically, the Harris Interactive Poll reported that 67% of adults, representing some 154 million people in the United States, have looked for health information on the Internet since the beginning of 2009 (Harris poll, 2009). Also, the number of Web sites that provide health information has increased and now includes individually produced web pages such as blogs and personal homepages. Further, diet-related institutions and organizations, including the ADA, the CDC, and the FDA, have Web sites as well (Hong, 2005; Neuhauser & Kreps, 2003). For these reasons, the role of the Internet in delivering diet and nutrition information has become an important topic of study.

Some studies have focused on the factors that influence users' online information-seeking behavior relative to diet and nutrition. For example, Mitchell and Boustani (1993) suggested that females pay more attention to nutrition-related risks than do males. Indeed, Nayga (1997) found that, compared to females, males tend not to perceive nutrition as being important when they buy food. In addition, Szwajcer, Hiddink, Koelen, and Woerkum (2005) investigated how pregnant women seek nutrition information. The data used in the study were collected through in-depth interviews, and the researchers found that the Internet is an important source among first-time pregnant women because of its anonymous and up-to-date information sources. These studies imply that the effectiveness of diet and nutrition communication via the media is

determined by how well the media communicate with people and how aptly people choose scientific information (Ayooob, Duyff, & Quagliani, 2002; Goldberg, 2000).

Although previous studies have suggested factors that have an impact on users' perceptions and behavior in terms of diet and nutrition communication, they usually have focused on demographic variables of the audience, such as gender and health status. Thus, further studies are needed for a comprehensive understanding of the role of online diet and nutrition information (Charlton, Brewitt1, & Bourne, 2004).

Regarding this online information, Abbott (1997) evaluated public understanding of diet and nutrition information and underscored the importance of online users' recognition of misinformation among the flood of information available online. This is because misinformation can harm receivers. Especially when the information relates to health problems, such misinformation can even pose a serious threat to consumers' health (Ayooob, Duyff, & Quagliani, 2002). In this context, media credibility is considered an important determinant in health communication. Although TV has been the most popular and credible form of media until now, the Internet has increasingly become a crucial source of information (*Nutrition and You: trend survey*, 2008). Thus, organizations must deliver health information conscientiously through the Internet because it has the potential to influence the health of audiences (Evers, Prochaska, Prochaska, Driskell, Cummins, & Velicer, 2003).

The Risk of Diet and Nutrition Misinformation

Holgado et al. (1999) suggested that when people seek diet and nutrition information, they should determine the source and assess its reliability. From the providers' perspective, messages should be created carefully to address consumers' needs for effective diet and nutrition communication (Holgado, Martinez-Gonzalez, Irala-Extevez, Gibney, Kearney, & Martinez,

1999). Most of all, messages provided by the media must be considered carefully because the content they provide may have a significant impact on changing the behavior of the public.

Despite the concern for delivering diet and health information, the American Dietetic Association (ADA) reported that one in five consumers said they are sometimes confused by the dietary advice they received (Ayoob, Duyff, & Quagliani, 2002; *Nutrition and You: Trends Survey*, 2000). In particular, people have been suspicious about online health information because of the largely unregulated online environment (Abbott, 1997). Further, the copious amounts of online health information foster confusion among people because of the difficulty involved in determining the veracity of the information they find (Ayoob, Duyff, & Quagliani, 2002). Misinformation can be provided to people quickly and easily because the online environment enables people to share their opinions publicly. For example, inaccurate advice provided by unqualified individuals can be exchanged in chat rooms, especially since most chat rooms allow users to remain anonymous (Flanagin & Metzger, 2003; Neuhauser & Kreps, 2003). Also, the exchange of e-mail frequently delivers to the public false information about health issues or products (Baker, Wagner, Singer, & Bundorf, 2003). This characteristic of the Internet causes users to become confused and to change their perceptions and behavior, which can certainly be harmful but could also be good if it discourages people from acting on misinformation (Ayoob, Duyff, & Quagliani, 2002; Benigeri & Pluye, 2003; Neuhauser & Kreps, 2003).

Assessment of Online Information Credibility: The Effects of Source Expertise and Message Accuracy

Although advances in technology help people acquire tremendous amounts of information easily, this flood of new information may allow misinformation to inform people's perspectives (Harris, 1995; Lindeman, Keskivaara, & Roschier, 2000). Misinformation can be

harmful to receivers, especially in the case of health-related issues. In fact, it can even threaten people's health (*Nutrition and You: trend survey, 2002*). Therefore, the ongoing debates over media credibility have attracted substantial attention (Gaziano & McGrath, 1986; Sundar & Nass, 2001). Until now, most of these debates have focused on the medium of television. For decades, television has been the most popular and, for many people, the most credible media channel (*Nutrition and You: trend survey, 2008*). However, with an increasing number of people turning to online sources for health information, the Internet has become a powerful influence on health matters (Evers, Prochaska, Prochaska, Driskell, Cummins, & Velicer, 2003). Although the Internet makes useful information readily available to users, it nonetheless has inherent potential hazards that people may encounter when seeking health information online. Sillence, Briggs, Fishwick, and Hattis (2007) suggested that these hazards stem from the unregulated nature of the Internet. Thus, many studies into online information have focused on Web site credibility (e.g., Fogg, Marshall, Laraki, Osipovich, Varnma, & Fang, 2001; Walther, Wang, & Loh, 2004).

Media credibility refers to the notion that which channel is used to deliver messages to audiences has an impact on audiences' perception of the credibility of those messages (Gunther, 1992). In the early research into media credibility, Hovland and Weiss (1951) found that the trustworthiness of a source positively affected both the acceptance of messages and the changes the messages made in the mind of the receiver. Focusing on media channels, Ganziano and McGrath proposed a credibility scale for newspaper and television content (as cited in Kioussis, 2006). In addition, Hawkins (1999) suggested some criteria for determining online media credibility. The criteria include the currency of the site's information, the purpose or audience for the site, apparent bias or objectivity of the information, and questions about the author or publisher of the information, including whether the author's name appears on the site, whether

the author is well known and well qualified, and whether the publisher represents a reputable organization. Although different concepts are available to explain media credibility, Walther (2004) mentioned that credibility is considered multidimensional, and that its concepts overlap considerably. Centering on the concept of media credibility, several studies have focused on the factors that affect the credibility of online information. Of these factors, two major criteria seem to be the most important to determine the perception of credibility: source and content effects (Austin & Dong, 1995; Kiouisis, 2006).

Regarding source effects on media credibility, a Pew Internet Survey reported that most people (86%) who use online health information are worried about “unreliable sources online.” Therefore, online health information seekers tend to evaluate the sources of online information more so than other Internet users. Eysenbach (2008) stated that users are influenced by “surface credibility such as Web site design” (p.126) that made sites appeared professional. For example, “markers such as the picture of the site owner” (p.126) have an impact on users’ perceptions of Web site credibility (Eysenbach, 2008). In this context, Rieh and Belkin (1998) found that source credibility operates on two levels in users’ evaluation of online information: institutional and individual. Institutional credibility is related to the domain of the Web sites, while individual credibility is related to the names of the authors or creators of the Web pages. Specifically, Rieh and Belkin (1998) found that at the institutional level, respondents generally perceived *.edu* and *.gov* sites as providing better qualified information than *.com* sites. Also, Treise, et. al (2003) measured Web site expertise through domain credibility and found that science Web sites with a *.gov* domain are perceived to be more credible than Web sites with a *.com* domain. At the individual level, author affiliations, such as the person’s occupation or the institution for which he or she worked, have a significant impact on respondents’ perceptions of information

credibility. Similarly, Flanagin and Metzger (2003) identified the credibility of the Web site sponsor as source credibility, and Web site sponsor credibility was measured using the five elements of sponsor believability, integrity, positive reputation, success, and trustworthiness. Consistent with these conceptualizations of source credibility, studies related to online health information have sought to examine the relationship between source expertise and Web site credibility. Eastin (2001) proposed that knowledge of content and source expertise have a strong influence on users' perception of the credibility of health Web sites. Treise, et al. (2003) and Walther (2004) agreed that source expertise is a primary factor in perception of Web site credibility.

Another important factor that influences the assessment of online information is message credibility, also sometimes called content effects (Kunst, Groot, Latthe, Latthe, & Khan, 2002). Message credibility refers to the degree to which the message alone is believable, regardless of the source (Flanagin & Metzger, 2000; Meyer, 1988). In terms of message credibility, Meyer (1988) suggested five dimensions that influence message credibility in news channels: fairness, bias, depth, accuracy, and trustworthiness. Flanagin and Metzger (2000) also used five items to measure message credibility: believability, accuracy, trustworthiness, bias, and completeness. In a more recent study, Bucy (2003) proposed an index of message credibility that included the elements of believability, fairness, accuracy, informativeness, and depth. Based on these arguments, *accuracy* is a common factor in message credibility. Kunst, Groot, Latthe, Latthe, and Khan (2002) emphasized the importance of message accuracy for Web site credibility. Specifically, they measured the relationship between message accuracy and perceived credibility for five health topics and confirmed that content accuracy was strongly related to the credibility of a Web site. In addition, Dutta-Bergman (2004) observed that message accuracy is a key factor

in assessing the credibility of online health information, in particularly for informative messages. Therefore, this study's attempt to measure the predictors of perceived Web site credibility takes into consideration the important role source expertise and accuracy seem to play in determining users' perception of Web site credibility.

However, few previous studies have attempted to investigate whether the relationship between message accuracy and source expertise influences perceived credibility. There appear to have been no previous studies exploring the relationship between message accuracy and source expertise. Harris, Sillence, and Briggs (2009) suggested that "future research needs to explore what happens when sites containing credible design cues present incorrect information but noncredible sites present correct information" (¶35). To supplement these previous studies, the present research seeks to elucidate how source expertise and message accuracy affects users' perceptions of the credibility of Web sites providing nutrition information. . In doing so, this study proposes the following research question:

RQ1: How, if at all, are perceived source expertise and message accuracy related to consumer's evaluations of the credibility of Web sites providing diet and nutrition information?

Elaboration Likelihood Model of Persuasion

To explain how people use online health information, the elaboration likelihood model (ELM) is employed. The ELM stems from the persuasion approach, which explains how people process messages presented in media (Petty, Cacioppo, & Schumann, 1983). Petty and Cacioppo (1986) proposed two routes involved in this process: the central route, which reflects a careful and thoughtful assessment of arguments; and the peripheral route, in which responses are based on assessments of the cognitive, affective, or behavioral cues in the message. Specifically, of these two different information-processing mechanisms, the central route involves a deeper processing of the message provided by media. This means that the receiver who processes via the

central route pays more attention to the arguments that appear in the messages and tends to understand the message more thoroughly. Alternatively, the peripheral route involves attention to source cues provided by the message. In other words, a peripheral route decision indicates a simple inference about the argument without complex cognitive processing. For example, the peripheral route typically focuses on factors such as the “attractiveness of source, source credibility, and the number of sources endorsing a position” (Dutta-Bergman, 2004, p.255). Central route processing relies on the quality of the message, while peripheral route processing takes into consideration shortcut cues such as design features of the sites themselves (e.g., layout, graphics, fonts, colors, etc.) (Flanagin & Metzger, 2007; Miniard, Bhatla, Lord, Dickson, & Unnava, 1991).

In the context of the dual processing model, previous studies related to online media have focused on surfing versus searching. Mulphy (1998) explained that surfing involves the peripheral route, whereas searching involves the central route. That is, information seekers generally use the central route, which focuses on goal-directed action, while surfing occurs in an unplanned environment that is serendipitous in nature (Carmel, Crawford, & Chen, 1992; Dutta-Bergman, 2004; Marchionini, 1987; Marchionini & Shneiderman, 1988). In a recent study, Wise and Kim (2008) investigated how content acquired through searching and surfing exerts an influence on the cognitive processing of online media content. They found that searching is more effective than surfing at encoding content, which means that individuals who take the searching approach are more likely to retain the information they find. Therefore, different ways of acquiring information – searching and surfing – may have a crucial influence on determining cognitive outcomes (Wise & Kim, 2008).

Although the ELM provides a useful perspective to explain how message and source cues work in information processing for users, few studies using the ELM relate directly to online diet and nutrition information. To supplement the previous studies, this study uses an experiment to learn how people use online message and source cues in their processing of information.

Overall, the literature review suggests which factors – source expertise and message accuracy – consumers should take into account in evaluating the credibility of online health information. The ELM offers an effective perspective for explaining how message and source cues work in information processing. In this sense, most previous studies on source cues have been considered representative of the peripheral route, while message cues have been seen as indicative of the central route (Dutta-Bergman, 2004; Petty & Cacioppo, 1986). Here, the reasoning is that evaluating message cues, like message accuracy, require greater cognitive effort than recognizing source cues, such as Web site sponsorship. Based on these arguments, this study examines the following hypothesis.

H1: Source expertise will have greater impact on Web site credibility when message accuracy is low rather than high.

H2: Message accuracy will have greater impact on Web site credibility when source expertise is low rather than high.

That is, it seems logical that when people are exposed a Web site providing a low level of message accuracy, they will perceive the information attributed to a highly expert source as more credible than information from a source low in expertise.

The Role of Involvement

Involvement in communication messages has been identified using various conceptual and operational definitions (Slater, 1997; Stephenson & Palmgreen, 2001). Regarding the issue,

Johnson and Eagly (1989) proposed two dimensions: value-relevant and outcome-relevant involvement. Value-relevant involvement is related to enduring values, such as freedom, while outcome-relevant involvement is related to goals that are desired currently, such as winning a game (Johnson & Eagly, 1989; Petty & Cacioppo, 1990). Petty and Cacioppo (1990) suggested that involvement refers to *issue involvement*, defined as “the extent to which the attitudinal issue under consideration is of personal importance” (Petty & Cacioppo, 1979, p. 1915). For this study, involvement is conceptualized as issue involvement, as suggested by Petty and Cacioppo.

Involvement has been treated as an important factor in persuasion. Prior studies that have employed the ELM have shown that issue involvement is a significant moderator that affects users’ perceptions and attitude change. In particular, studies in social psychology have observed that there are different influences on persuasion under high and low involvement conditions.

Online health communication research has demonstrated that issue involvement is strongly related to users’ perceptions and behavior regarding their health. This is explained by the interactivity users have with the Internet (Neuhauser & Kreps, 2003). This interactivity allows people to become engaged with issues that appear on Web sites (Rice & Katz, 2000). According to the ELM, it is reasonable to predict that health-oriented messages produce the strongest impact on users’ perceptions when users are highly involved in the message being communicated (Street & Piziak, 2001). Consistent with this approach, the ELM can be useful in predicting how involvement moderates the influence of perceived Web site credibility. In applying the ELM to this study, central cues, such as message accuracy, are expected to have a greater effect on credibility judgments under high involvement than under low involvement conditions. On the other hand, peripheral cues, such as the expertise of the source, should have a

greater impact on persuasion under low as opposed to high involvement conditions. Based on this argument, this study also examines the following research hypothesis:

H3: The relationship between source expertise and web site credibility will be stronger under the low-involvement compared the high-involvement condition.

H4: The relationship between message accuracy and credibility will be stronger under high-involvement compared the low-involvement condition.

That is, when people are highly involved, they will use the central route (i.e. message accuracy) rather than the peripheral route (i.e. source expertise). On the other hand, when people are not much involved, they will use the peripheral route (i.e. source expertise) rather than the central route (i.e. message accuracy). In addition, different information processing activities through the central and peripheral routes will lead to different perceptions of Web site credibility.

CHAPTER 3 RESEARCH METHODS

This study was designed to investigate the impact of source and message variations on assessments of Web site credibility. The present study has a between-participants experimental design with two independent variables: source expertise and message accuracy. In addition, involvement was measured as a co-variate.

Sample Selection

Participants for the present study were recruited from large classes in the College of Journalism and Communications at the University of Florida, and they were compensated for their time with extra credit. Undergraduate students of any age were allowed to participate in the analysis. Participants were randomly assigned to one of the four study conditions.

The rationale for focusing on college students is that the research demonstrates that the primary users of online information are the younger and better educated segments of the population. According to a 2008 survey conducted by the Pew Research Center, approximately one third of college students younger than age 30 go online for their information. In addition, according to the National College Health Risk Behavior Survey, college students pay a great deal of attention to diet and nutrition information because they tend to be particularly concerned with weight loss and body shape (Lowry, Galuska, Fulton, Wechsler, Kann, & Collins, 2000). Therefore, using college students is reasonable for the present study.

Online Experimental Procedure

To collect the data, an online experiment was conducted using the Qualtrics online survey system. The online experiment used four versions of the questionnaire to create four experimental conditions: low source expertise – inaccurate message; low source expertise – accurate message; high source expertise – inaccurate message; and high source expertise –

accurate message. Each participant was randomly assigned to complete one version of the questionnaire.

When participants logged in to the survey site, they first saw the informed consent document. Students who agreed to participate were asked to follow a link to sample Web site, which presented a Web page stimulus. After reading the Web page, participants rated the level of source expertise and the Web page's message accuracy, and then they answered questions about overall Web site credibility. In the last page of the questionnaire, they were asked about demographic information, including gender, age, education, current marital status, ethnic background, height, and weight.

Web Page Stimuli

Four different Web page designs were created. The Web pages contained health messages related to diet and nutrition and varied in terms of source expertise and message accuracy (see Appendix A). The content of the Web pages was determined based on recent trends regarding consumers' knowledge about healthy foods. This design model takes its lead from the ADA's 2008 survey, which inquired into the consumption of specific foods and found that more than half (56%) of the respondents had recently increased their intake of whole grain foods in response to health information. Specifically, most respondents (94%) said that "they believe whole-grain bread is healthier than white bread" (Nutrition and You, 2008, p. 8).

In this context, previous nutrition studies have revealed that whole grain foods provide significant health benefits in comparison to refined grain foods (Jacobs, Pereira, & Slavin, 2000). For example, McIntosh, Noakes, Royle, and Foster (2003) found that whole grain food consumption increased metabolic health among overweight middle-aged men, and therefore they argued that whole grain foods seem likely not only to improve a normal diet but also to reduce the risk of cancers such as colon cancer.

For this study, the information about whole grain intake was taken from a press release provided by the ADA, and the message was manipulated. Specifically, the message about whole grain foods was used as it appeared in the press release for the accurate message and then was rewritten to create an inaccurate message. (e.g., It's important to include whole grains in your diet. vs. Whole grains are not that important in your diet.). To manipulate source expertise, the Web pages were identified as coming from one of two Web sites: the CDC Web site and a personal blog. In addition, the same author was listed in all four versions of the Web page. Table 3-1 shows the information about each stimulus.

Table 3-1. Web page versions

Versions	Conditions	Websites
1	High source expertise	High message accuracy
2	Low source expertise	Low message accuracy
3	High source expertise	High message accuracy
4	Low source expertise	Low message accuracy

Online Experimental Instrument

After viewing the Web page, participants completed the questionnaire, which asked participants to rate the Web site's credibility and also included post-manipulation check items measuring general knowledge about whole grains, perceptions of source expertise and message accuracy, as well as issue involvement, Internet experience and demographic variables.

Independent Variables

Source expertise

Source expertise is concerned with the perceived credibility of the sponsor (Flanagin & Metzger, 2003). Flanagin and Metzger (2003) measured Web site sponsor credibility and used a factor analysis to identify five items that influenced perceived source expertise: "the extent to which the sponsor was perceived to be credible, to have high integrity, to have a positive reputation, to be successful, and to be trustworthy" (Flanagin & Metzger, 2003, p. 692). These

same five items were used to measure perceived source expertise. Each Web message was rated on a set of 7-point bipolar rating scales. The five questions assessing source expertise include:

- This site sponsor is credible.
- This site sponsor has high integrity.
- This site sponsor's reputation is positive.
- This site sponsor is successful.
- This site sponsor is trustworthy.

Message accuracy

Message accuracy is one of the characteristics contributing to message credibility.

Previous studies (e.g., Bucy, 2003; Flanagin & Metzger, 2000; Meyer, 1998) measured message accuracy using a single item, and this study used the same item. Specifically, participants rated message accuracy using a 7-point Likert scale ranging from 1 (*Totally inaccurate*) to 7 (*Totally accurate*).

Dependent Variable

Web site credibility

Credibility has been identified and measured in many ways (Eastin, 2006). To assess Web site credibility, this study used 12 items to measure four dimensions that are commonly recognized in studies about credibility (Gaziano & McGrath, 1986; Hong, 2005; Hovland & Weiss, 1951). That is, Web site credibility includes fairness, depth, goodwill, and trust.

Specifically, questions assessing fairness include:

- This site provides information that is neutral.
- This site provides information that is balanced.
- This site is biased in the information it provides. (reverse-coded)
- This site is slanted in the information it provides. (reverse-coded.)
- This site is even-handed in presenting information.

Questions about depth are:

- This site provides in-depth information.
- This site is comprehensive.

- This site offers everything you need to know on the topic.

To evaluate goodwill, questions are:

- This site has my interests at heart.
- This site is concerned about its visitors.

Questions about trust include:

- This site is ethical.
- This site is trustworthy.

All items were rated on 7-point bipolar rating scales from “Strongly disagree” to “Strongly agree.”

Control Variables

Issue involvement

According to the definition of involvement suggested by Petty and Cacioppo, three items measure involvement. These items include concern, relevance, and importance of the issue of whole-grain food intake. Thus, involvement was measured using three statements:

- I am concerned about including whole grain foods in my diet.
- Information about whole grain foods is very relevant to me.
- Understanding the value of whole grain foods is important to me.

Each statement was rated on a 7-point rating scales, with 1 meaning “Strongly disagree” and 7 meaning “strongly agree.” The means of involvement were used to divide the subjects into two groups: high involvement and low involvement.

Internet experience and demographic variables

Flanagin and Metzger (2000) have suggested that Internet experience and demographic characteristics have critical influences on perceived Web site credibility. They measured Internet experience using five items: “Internet/WWW use, experience, expertise, familiarity, and access” (Flanagin & Metzger, 2000, p.522). Specifically, respondents were asked to assess the frequency

of their Internet usage, their experience using the Internet, their level of expertise, their level of familiarity with the variety and the amount of information available on the Internet/WWW, and their level of Internet access in terms of the degree of ease with which they are able to access the Internet. Thus, the questions about Internet experience include:

- I frequently use the Internet.
- I have a great deal of experience using the Internet.
- I am expert in using the Internet.
- I am very familiar with the Internet.
- It is easy for me to access the Internet.

Each statement was rated on a 7-point rating scale, with 1 meaning “Strongly disagree” and 7 meaning “strongly agree.” Also, to investigate whether demographic characteristics had an impact on perceived Web site credibility, respondents were asked about their gender, age, current level of education, marital status, and racial/ethnic background.

Table 3-2 shows the summary of independent variables, the dependent variable, and control variables used in the present study.

Table 3-2. Summary of Variables

Variable	Operational definition	Items	Sources
Source expertise	Perceived Web site sponsor credibility (whether the Web site sponsor is a qualified expert or not)	This site sponsor is credible. This site sponsor has high integrity. This site sponsor’s reputation is positive. This site sponsor is successful. This site sponsor is trustworthy.	Flanagin & Metzger (2003)
Message Accuracy	Whether or not the message on a Web site is accurate	This message is accurate.	Bucy (2003) Flanagin & Metzger (2000) Meyer (1998)

Table 3-2. Continued

Variable	Operational definition	Items	Sources
Web site credibility	The extent to which the Web site is perceived to demonstrate fairness, depth, goodwill, and trustworthiness.	This site provides information that is neutral. This site provides information that is balanced. This site is biased in the information it provides. (reverse-coded) This site is slanted in the information it provides. (reverse-coded) This site is even-handed in presenting information. This site provides in-depth information. This site is comprehensive. This site offers everything you need to know on the topic. This site has my interests at heart. This site is concerned about its visitors. This site is ethical. This site is trustworthy.	Gaziano & McGrath (1986) Hong (2005) Hovland & Weiss (1951)
Issue involvement	The degree to which the subject of whole grain foods is of concern, relevance, and importance to participants.	I am concerned about including whole grain foods in my diet. Information about whole grain foods is very relevant to me. Understanding the value of whole grain foods is important to me.	Petty & Cacioppo (1979, 1986, 1990)
Internet experience	The degree to which participants are comfortable with using the Internet	I frequently use the Internet. I have a great deal of experience using the Internet. I am expert in using the Internet. I am very familiar with the Internet. It is easy for me to access the Internet.	Flanagin & Metzger (2000)

Pilot Test Measures: Pre-Manipulation Check

Before the main study, a pilot test was performed of the Web site stimuli constructed by the researcher. The purpose of the pilot test was to evaluate the manipulations of message accuracy and source expertise in four versions of a Web page providing the same basic

information. Thirty-three participants for the pilot test were recruited from two undergraduate classes at the College of Journalism and Communication at the University of Florida; they were different from participants in the main study. Pilot test participants were presented with each Web page and asked to rate the source expertise and message accuracy of the pages. The questionnaire pages was developed using Qualtrics software.

Of the 33 questionnaires collected, 5 provided incomplete responses and were dropped from subsequent analysis and 28 responses were analyzed. Source expertise items addressed the extent to which participants recognized the expertise of the Web site’s source and included of 5 items (Chronbach’s alpha=0.97) and determined that respondents do, in fact, perceive pages coming from the Centers for Disease Control as having higher source expertise. In addition, message accuracy was rated using a 7-point Likert scale ranging from 1 (*Totally inaccurate*) to 7 (*Totally accurate*).

Data collected in the pilot test were examined using T-tests to check the statistical significance of ratings of source expertise and message accuracy. The analysis confirmed that there were significant differences in perceived sponsor expertise between the CDC Web site and the personal blog. In terms of Web site sponsor expertise, the level of source expertise differed significantly between the two Web sites ($t = 4.69, p < 0.001$) and the respondents perceived the CDC Web site ($M = 5.28, SD = 1.13$) is more expertise than personal blog ($M = 3.48, SD = 0.89$) as shown in Table 3-3.

Table 3-3. T-test for Web site manipulation check: Web site sponsor expertise

	N	Mean	Std. Dev.	Std. Error Mean	t-test for Equality of Means	
					t	df
CDC Web site	16	5.28	1.13	0.28	4.69**	25.92
Personal blog (Susan’s nutrition weblog)	12	3.48	0.89	0.26		

**p< .001

In addition, the level of message accuracy also differed significantly between the two versions of the whole grain message ($t = 3.77, p < 0.001$). Table 3-4 shows that the original (accurate) message ($M = 4.94, SD = 1.18$) was perceived as more accurate than the re-written (inaccurate) message ($M = 3.17, SD = 1.27$).

Table 3-4. T-test for Web site manipulation check: Message accuracy

	N	Mean	Std. Dev.	Std. Error Mean	t-test for Equality of Means	
					t	df
Accurate message	16	4.94	1.18	0.3	3.77**	22.88
Inaccurate message	12	3.17	1.27	0.37		

** $p < .001$

The pilot test findings confirmed that the four versions of the Web message could be used in the main study.

Data Analysis

All collected data were analyzed using SPSS, the Statistical Package for the Social Sciences program. To measure the sample profile and reliability of each variable, descriptive statistics and Cronbach's alpha reliability coefficients were used. For the first research question, Pearson's correlation analysis was conducted to determine the relationship between the independent variables (source expertise and message accuracy) and the dependent variable (Web site credibility). Two-way analysis of variance (ANOVA) was used to determine whether there were statistically significant interaction effects between source expertise and message accuracy on Web site credibility to test Hypotheses 1 and 2. Lastly, the relationship between the independent variables and the dependent variable was tested in an analysis of covariance (ANCOVA) with issue involvement as a covariate to test Hypotheses 3 and 4.

CHAPTER 4 RESULTS

This chapter discusses the characteristics of study respondents their ratings of the source expertise and message accuracy of the web pages. In addition, the chapter includes discussion of the results of and the hypothesis tests conducted using Pearson's correlation analysis, two-way ANOVA, and ANCOVA. The dependent variable for all analyses was Web site credibility.

Profile of the Sample

Four hundred students completed questionnaires. However, 26 incomplete responses were dropped from subsequent analyses, for a total valid sample size of 374. As shown in Table 4-1, female participants (68.2%, n=255) outnumbered male participants (31.8%, n=119). The ages of participants ranged from 18 to 29, with a mean age of 19.86 years old and a median age of 20 years old (29.9%, n=112). Of all participants, 62 were freshmen (16.6%), 123 were sophomores (32.9%), 133 were juniors (35.6%), and 56 were seniors (15%). The majority of participants were single (96%, n=359). In terms of ethnic background, more than half of the participants (59.6%, n=223) were non-Hispanic whites, and 45 were Hispanic (12%), 24 were African-American (6.4%), 18 were Asian (4.8%) and 64 were other ethnic groups (17.1%).

Table 4-1. Demographic description

Variable	Frequency	Percent
Gender		
Male	119	31.8
Female	255	68.2
Age		
18-21	337	90.1
22-25	35	9.3
26-30	2	0.6
Education Level		
Freshmen	62	16.6
Sophomore	123	32.9
Junior	133	35.6
Senior	56	15.0

Table 4-1. Continued

Variable	Frequency	Percent
Marital status		
Single	359	96
Married	4	1.1
Other	11	2.9
Ethnic background		
Non-Hispanic	223	59.6
Hispanic	45	12.0
African American	24	6.4
Asian	18	4.8
Other	64	17.1

N=374

Media Usage and Diet-Nutrition Information

To explain how subjects use the media, especially the Internet, the online experimental instrument included questions about participants' media use for diet and nutrition information. First, regarding the questions about whether subjects had ever visited the CDC Web site and/or the personal blog used as Web site stimuli in the present study, 31 reported that they had visited the CDC Web site (8.29%) but 171 had not visited the CDC Web site (45.72%). None of the subjects reported having visited the personal blog (46.00%, n=172).

Participants also were asked about what kind of media they usually use in order to get diet and nutrition information. The majority of subjects reported using the Internet (39.3%, n=147) to get diet and nutrition information, followed by other people such as parents and friends (20.3%, n=76), health professionals (19%, n=71), newspaper/magazines (14.2%, n=53), television/radio (5.6%, n=21), and other sources (1.6%, n=6). This finding indicates that the Internet is the medium most frequently used to get diet and nutrition information. Third, in terms of frequency of Internet usage for diet and nutrition information, most subjects had used the Internet once or twice for diet and nutrition information (44.1%, n=165), followed by once a

month (23%, n=86), once a week (7.5%, 28), and daily (2.1%, n=8), while 87 subjects had never sought diet and nutrition information online (23.3%). Table 4-2 summarizes these results.

Table 4-2. Use of the Internet and other source for diet and nutrition information

Variables and Items		Frequency	Percent
Visit CDC Web site	Yes	31	8.29
	No	171	45.72
Visit Personal blog (Susan's Weblog)	Yes	0	0
	No	172	46.00
Media type	Television/Radio	21	5.6
	Newspaper/Magazines	53	14.2
	Internet	147	39.3
	Health professionals	71	19.0
	Other people	76	20.3
	Others	6	1.6
Frequency of Internet usage	Never	87	23.3
	Once or twice	165	44.1
	Once a month	86	23.0
	Once a week	28	7.5
	Daily	8	2.1

N=374

Post-Manipulation Check

As predicted by the pilot test manipulation check, in the results of the main study showed that there were significant differences in respondents' perceptions of source expertise ($t = -6.99, p < 0.001$) and message accuracy ($t = -15.41, p < 0.001$) depending on which version of the Web page they saw. As shown in Table 4-3, subjects perceived that the CDC Web site as higher in source expertise ($M = 4.94, SD = 0.98$) than the personal blog ($M = 4.27, SD = 0.85$) and perceived the original (accurate) message as more accurate ($M = 5.38, SD = 0.77$) than the re-written (inaccurate) message ($M = 3.73, SD = 1.25$). Additionally, there were significant differences between subjects who were highly involved ($M = 6.09, SD = 0.58$) and those who were lowly involved ($M = 3.96, SD = 0.98$) in whole grain issue ($t = -24.61, p < 0.001$).

Table 4-3. T-test for Web site manipulation check: Web site sponsor expertise, message accuracy, and issue involvement

	N	Mean	Std. Dev.	Std. Error Mean	t-test for Equality of Means	
					t	df
Source expertise						
CDC Web site	202	4.94	0.98	0.07		
Personal blog (Susan's nutrition weblog)	172	4.27	0.85	0.06	-6.99**	372
Message accuracy						
Accurate message	190	5.38	0.77	0.06		
Inaccurate message	184	3.73	1.25	0.09	-15.41**	372
Issue involvement						
High involvement	165	6.09	0.58	0.45		
Low involvement	209	3.96	0.98	0.68	-24.61**	372

**p < .001

Reliability Test

Generally, Cronbach's alpha is used to ensure internal reliability, which indicates internal consistency between items that measure the same variable (Spathis & Ananiadis, 2005). Nunnally (1978) suggested that research instruments could be considered acceptable if they produced Cronbach's alpha reliability coefficients of 0.70 or higher. As shown in Table 4-4, all Cronbach's alpha values were above 0.70, and therefore all scales were used in the present study.

Table 4-4. Means and reliability check for each variable

Variables and Items		Mean	Cronbach's alpha
Source expertise	This site sponsor is credible.	4.65	0.95
	This site sponsor has high integrity.	4.57	
	This site sponsor's reputation is positive.	4.70	
	This site sponsor is successful.	4.64	
	This site sponsor is trustworthy.	4.62	
Website Credibility	This site provides information that is neutral.	3.59	0.89
	This site provides information that is balanced.	3.73	
	This site is biased in the information it provides. (reverse-coded)	3.66	
	This site is slanted in the information it provides. (reverse-coded)	3.41	
	This site is even-handed in presenting information.	3.99	
	This site provides in-depth information.	3.74	
	This site is comprehensive.	4.71	

Table 4-4. Continued

Variables and Items	Mean	Cronbach's alpha
This site offers everything you need to know on the topic.	3.08	
This site has my interests at heart.	4.75	
This site is concerned about its visitors.	4.86	
This site is ethical.	4.89	
This site is trustworthy.	4.50	
Issue involvement		
I am concerned about including whole grain foods in my diet.	4.82	
Information about whole grain foods is very relevant to me.	4.84	0.84
Understanding the value of whole grain foods is important to me.	5.06	
Internet experience		
I frequently use the Internet.	6.78	
I have a great deal of experience using the Internet.	6.65	
I am expert in using the Internet.	5.81	0.88
I am very familiar with the Internet.	6.53	
It is easy for me to access the Internet.	6.75	

N=374

Research Question 1

RQ1: How, if at all, are perceived source expertise and message accuracy related to consumer's evaluations of the credibility of Web sites providing diet and nutrition information?

The first research question asked whether there is a relationship among source expertise, message accuracy, and the credibility of Web sites providing diet and nutrition information. To answer this question, a Pearson's correlation analysis was conducted. As shown in Table 4-5, Web site credibility was positively and significantly correlated with source expertise ($r = 0.53$, $p < 0.01$) and message accuracy ($r = 0.73$, $p < 0.01$).

Table 4-5. Correlations among source expertise, message accuracy, and Web site credibility

	Web site credibility	Source expertise	Message accuracy
Web site credibility	1.00		
Source expertise	0.53**	1.00	
Message accuracy	0.73**	0.54**	1.00

** $p < 0.01$ (2-tailed)

Hypotheses Testing

Hypotheses 1 and 2

H1: Source expertise will have greater impact on Web site credibility when message accuracy is low rather than high.

H2: Message accuracy will have greater impact on Web site credibility when source expertise is low rather than high.

Hypothesis 1 and 2 predicted interaction effects between source expertise and message accuracy. In other words, subjects exposed to a low source expertise Web site (i.e., personal blog) were predicted rate Web site credibility as higher when message accuracy was high rather than low. On the other hand, participants exposed to a Web site containing a low accuracy message were expected to perceive the Web site as more credible when source expertise was high rather than low.

To test these hypotheses, a two-way ANOVA was conducted to determine if there was an interaction effect between source expertise and message accuracy. As shown in Table 4-6, the ANOVA results indicated no significant interaction effect between source expertise and message accuracy on Web site credibility [$F(1, 370) = 0.06, p = 0.82$]. However, there were statistically significant main effects of source expertise [$F(1, 370) = 3.73, p < 0.05$] and message accuracy [$F(1, 370) = 163.61, p < 0.001$] on Web site credibility. Specifically, Table 4-7 shows that subjects exposed to a high source expertise Web site ($M = 4.16, SD = 0.91$) rated the Web site as more credible than those exposed to a low expertise Web site ($M = 3.97, SD = 0.92$). Similarly, subjects exposed to an accurate message ($M = 4.58, SD = 0.70$) rated the Web site's credibility as higher, compared to those exposed to an inaccurate message ($M = 3.55, SD = 0.84$). Therefore, Hypotheses 1 and 2 were not supported; source expertise and message accuracy do not produce a statistically significant interaction effect (see Figure 4-1).

Table 4-6. Two-way ANOVA for Web site credibility

	Type III Sum of Squares	df	Mean Square	F	Sig.
Source expertise	2.19	1	2.19	3.73	0.04
Message accuracy	96.05	1	96.05	163.61	0.00
Source expertise * Message accuracy	0.03	1	0.03	0.06	0.82
Error	217.22	370	0.59		
Total	6528.00	374			

$R^2 = 0.32$

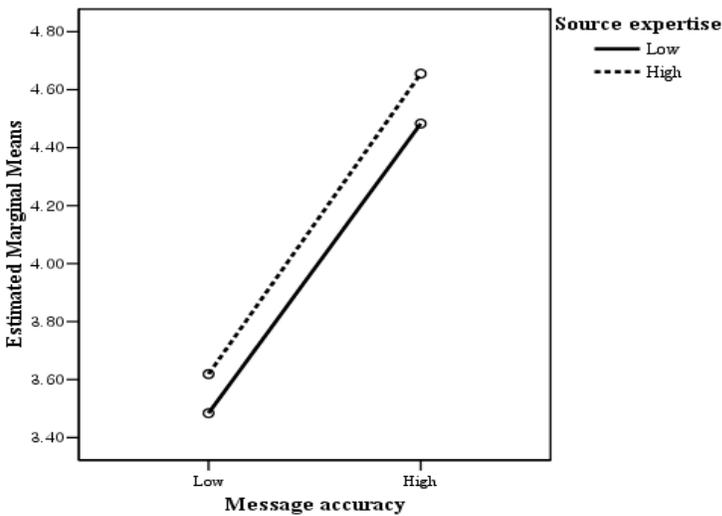


Figure 4-1. Interaction effect (Source expertise X Message accuracy) on Web site credibility

Furthermore, a comparison of the means for all four groups showed that perceived Website credibility was highest among those exposed to the accurate messages, regardless of the level of source expertise (See Table 4-7).

Table 4-7. Web site credibility ratings for groups with different levels of source expertise and message accuracy

Group	Source expertise	Message accuracy	M	SD	N
1	High	High	4.66	0.63	106
2		Low	3.62	0.87	96
3	Low	High	4.48	0.76	84
4		Low	3.48	0.79	88
Overall		High	4.58	0.70	184
		Low	3.55	0.84	190
		Total	4.08	0.92	374

Hypotheses 3 and 4

H3: The relationship between source expertise and web site credibility will be stronger under the low-involvement compared the high-involvement condition.

H4: The relationship between message accuracy and credibility will be stronger under high-involvement compared the low-involvement condition.

H3 and H4 assumed that issue involvement will influence the impact of source expertise and message accuracy on perceived Website credibility. As the first step to test these hypotheses, Pearson’s correlation analysis was conducted to examine the relationship between issue involvement and Web site credibility. Table 4-8 shows that issue involvement ($r = 0.14, p < 0.01$) was strongly correlated to Web site credibility.

Table 4-8. Correlations between issue involvement and Web site credibility

	Issue involvement	Web site credibility
Issue involvement	1.00	
Web site credibility	0.14**	1.00

** $p < 0.01$ (2-tailed)

For the next step, an ANCOVA was conducted, using involvement as the co-variate. As shown in Table 4-9, issue involvement had a significant main effect on Web site credibility [$F(1, 369) = 5.64, p < 0.05$]. This result revealed that issue involvement is also an important variable related to Web site credibility.

Table 4-9. ANCOVA for the effect of issue involvement, source expertise and message accuracy on perceived Web site credibility

	Mean	Type III Sum of Squares	df	Mean Square	F	Sig.
Source expertise		2.33	1	2.19	3.73	0.04
High	4.16					
Low	3.97					
Message accuracy		93.05	1	96.05	163.61	0.00
High	4.57					
Low	3.55					
Co-Variate		3.27	1	3.27	5.64	0.02
Issue involvement						
Error		213.95	369	0.59		

Table 4-9. Continued

	Mean	Type III Sum of Squares	df	Mean Square	F	Sig.
Total		6528.00	374			

$R^2 = 0.33$

Based on these results, a two-way ANOVA was conducted to examine the relationship between involvement and source expertise. Table 4-10 shows the results of that analysis, which revealed a significant main effect for source expertise [$F(1, 370) = 3.99, p < 0.05$] but not for involvement. In addition, there was no significant interaction effect of issue involvement and source expertise, as shown in Figure 4-2. Therefore, Hypothesis 3 was rejected.

Table 4-10. Two-way ANOVA for the effects of Issue involvement and source expertise on perceived Web site credibility

	Mean	Type III Sum of Squares	df	Mean Square	F	Sig.
Issue involvement		3.00	1	3.00	3.57	0.06
High	4.17					
Low	3.99					
Source expertise		3.35	1	3.35	3.99	0.04
High	4.16*					
Low	3.97*					
Issue involvement * Source expertise		0.02	1	0.02	0.02	0.88
Error		311.19	370			
Total		6528.00	374			

$R^2 = 0.02, *p < 0.05$

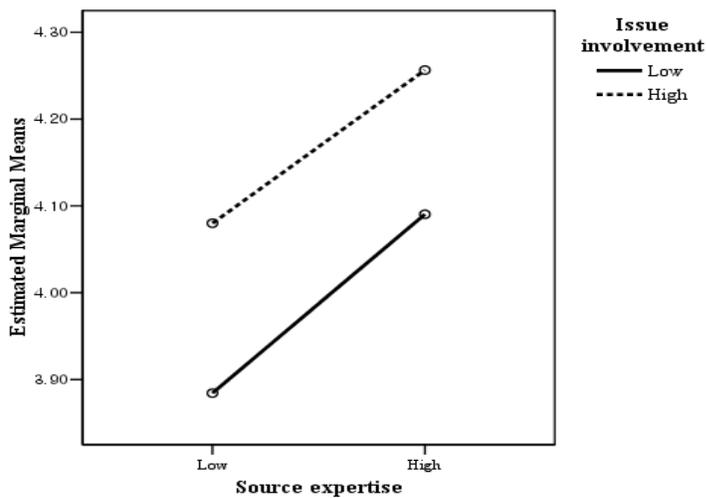


Figure 4-2. Interaction effect (Issue involvement X Source expertise) on Web site credibility

To test Hypothesis 4, a two-way ANOVA was performed to test for an interaction effect between issue involvement and message accuracy. As shown in Table 4-11, there was no significant main effect for issue involvement, but message accuracy [$F(1, 370) = 170.47, p < 0.05$] did produce a significant main effect on perceived Web site credibility; as would be predicted, the accurate message produced higher Website credibility ratings ($M = 4.58$) than the inaccurate message ($M = 3.55$). In addition, there was a significant interaction effect between issue involvement and message accuracy [$F(1, 370) = 6.67, p < 0.05$], as shown in Figure 4-3.

Table 4-11. Two-way ANOVA predicting perceived Web site credibility: Message expertise vs. Issue involvement

	Mean	Type III Sum of Squares	df	Mean Square	F	Sig.
Issue involvement		0.42	1	0.42	0.72	0.40
High	4.17					
Low	3.99					
Message accuracy		99.08	1	99.08	170.47	0.00
High	4.58*					
Low	3.55*					
Issue involvement * Message accuracy		3.88	1	3.88	6.67	0.01
Error		215.04	370	0.58		
Total		6528.00	374			

$R^2 = 0.32, *p < 0.05$

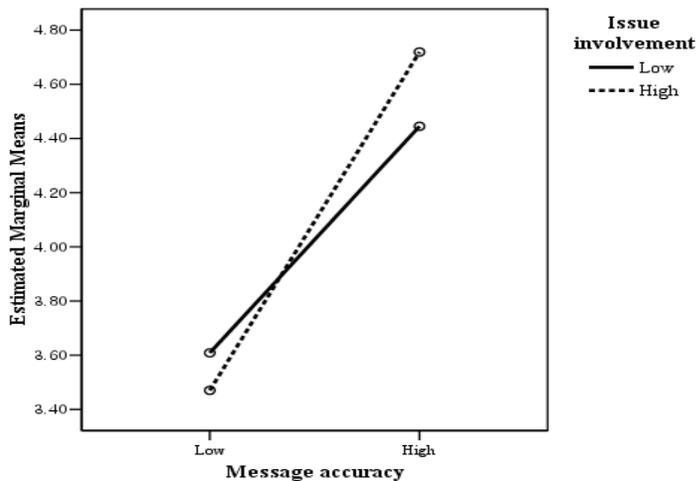


Figure 4-3. Interaction effect (Issue involvement X Message accuracy) on Web site credibility

Table 4-12 shows the impact of the message accuracy-by-involvement interaction on Web site credibility ratings. This analysis showed that message accuracy had a greater impact on perceived Web site credibility for highly involved participants (M= 4.17) than for low involvement participants (M= 4.00), as predicted in Hypothesis 4. This finding is consistent with the predictions of the ELM because message accuracy is related to central route processing, as discussed earlier. Therefore, Hypothesis 4 was supported.

Table 4-12. Means for Web site credibility of the groups with different levels of issue involvement and message accuracy

	High level of message accuracy	Low level of Message accuracy
High involvement	4.72	3.61
Low involvement	4.44	3.47

Additional Findings: The Role of Internet Experience and Demographic Variables as Covariates

Previous studies have mentioned that Internet experience and demographic variables play important roles in online users' perceptions of website credibility (Flanagin & Metzger, 2000). In the present study, the relationship among independent variables (i.e., source expertise and message accuracy) and the dependent variable (i.e., Web site credibility) was examined in an ANCOVA with Internet experience and demographic variables (i.e., gender, age, education level, marital status, and ethnic background) as covariates. The result showed that none of the covariates was significant after the main effects of source expertise and message accuracy had been accounted for. Therefore, Internet experience and demographic variables are not likely to have a significant relationship with users' perceptions of the credibility of a Web site providing diet and nutrition information.

CHAPTER 5 DISCUSSION

The primary purpose of the present study was to understand key influences on how people perceive the credibility of Web sites that provide diet and nutrition information. In particular, the study examined two major variables that are related to perceived Web site credibility: message accuracy and source expertise. The study was grounded in the Elaboration Likelihood Model, which predicts effects on credibility of message processing via a central versus a peripheral route. This chapter discusses the findings of the study in three subsections: interpretation of the findings regarding the research question and hypotheses, discussion of the theoretical and practical implications, and limitations and suggestions for further research.

Findings for the Research Question and Hypotheses

The Correlation between Independent Variables and the Dependent Variable

The first research question asked what relationships exist among source expertise, message accuracy, and Web site credibility. Pearson's correlation analysis confirmed that source expertise and message accuracy were strongly related with Web site credibility. This finding is consistent with those of previous studies that have identified two major criteria, source and content effects, as critical variables related to the perception of Web site credibility (e.g., Austin and Dong, 1995; Kioussis, 2006). Similarly, Rieh and Belkin (1998) investigated the factors that determine the credibility of online information using in-depth interviews with 14 scholars and concluded that authority of Web sites (i.e., identified institutional sites vs. individual sites) and accuracy of content were used to evaluate online information. In this context, the present study is meaningful to confirm that source expertise and message accuracy also play essential roles in evaluating the credibility of Web sites providing diet and nutrition information.

Interaction Effect between Source Expertise and Message Accuracy on Web site Credibility

Hypothesis 1 and 2 predicted that source expertise and message accuracy would interact in their effects on Web site credibility. In other words, the researcher predicted that source expertise would increase Web site credibility when message accuracy was low rather than high and that message accuracy would increase Web site credibility when source expertise was low rather than high. However, the result of ANOVA revealed that there was no significant interaction effect on Web site credibility. Therefore, Hypotheses 1 and 2 were not supported.

However, there were significant main effects of source expertise and message accuracy on Web site credibility, confirming that when source expertise and message accuracy are both high, perceived Web site credibility will be highest. Therefore, source expertise and message accuracy seem to affect separately Web site credibility separately. These findings are consistent with some prior research showing that source expertise has a significant influence on Web site credibility (e.g., Eastin, 2006; Flanagin & Metzger, 2003; Treise et al., 2003; Walther, 2004). The results related to message accuracy also support a previous study by Kunst et al. (2002), who argued that message accuracy is an important variable in evaluating Web site credibility. Furthermore, comparing the effect sizes between source expertise and message accuracy show that message accuracy has a greater effect on Web site credibility than source expertise.

The Relationship among Source Expertise, Message Accuracy and Issue Involvement

Hypotheses 3 and 4 predicted that source expertise and message accuracy would have different effects on Web site credibility depending on the user's level of issue involvement. Specifically, H3 predicted that message accuracy would have greater effects on Web site credibility when subjects are highly involved in the issue (i.e., whole grain intake), and H4 predicted that source expertise would have greater impact on perceived Web site credibility

when involvement was low. . Before the test of these hypotheses, Pearson's correlation and ANCOVA analyses were conducted to examine whether the issue involvement was a covariate of Web site credibility. The results showed that issue involvement was strongly correlated with perceived Web site credibility, and there was a significant main effect on Web site credibility. Therefore, issue involvement was predicted to interact significantly with source expertise and message accuracy in influencing perceived Web site credibility, and two ANOVA tests were performed.

The ANOVA test for Hypothesis 3 was conducted to investigate the interaction effect of source expertise and issue involvement on Web site credibility. The results indicated that there was no significant interaction effect between source expertise and issue involvement. The main effect of source expertise was significant, but issue involvement had no significant effect on perceptions of Web site credibility after controlling for source expertise effects. Therefore, Hypothesis 3 was not supported. The results imply that the combination of source expertise and issue involvement does not have a direct effect on Web site credibility. The ANOVA test for Hypothesis 4 was performed to examine the effects of the interaction between message accuracy and issue involvement on perceived Web site credibility. The results showed a significant interaction effect. Message accuracy had a greater impact on perceived Web site credibility for those who were highly involved with the issue, compared to those with low issue involvement. Perceived credibility of the high accuracy web sites was higher for those who were highly involved in the whole grain intake, but accuracy had less impact for participants who were less involved in the issue. Therefore, Hypothesis 4 was supported. This finding supports the ELM predicting central route cues will be more important for those who are highly involved (Petty & Cacioppo, 1979).

The Possibility of Other Covariates: Internet Experience and Demographic Variables

ANCOVA tests also were conducted to determine if Internet experience or any demographic variables functioned as covariates. The result revealed that none of the demographic variables tested, including Internet experience, gender, age, educational level, marital status, or ethnic background, had significant effects on perceived Web site credibility. Flanagin and Metzger (2003) actually had proposed that Internet experience and gender differences affect Web site credibility perceptions, but the present study did not support this argument. This may have occurred because the present study used Web sites providing diet and nutrition information, not overall online information. In other words, one possible explanation is that Internet experience and gender make no significant difference in influencing perceived credibility for online diet and nutrition information.

To summarize the results, the present study suggests that 1) source expertise and message accuracy are positively related to Web site credibility, 2) source expertise and message accuracy do not produce significant interaction effects, and 3) issue involvement is positively related to Web site credibility. In particular, there is a significant interaction effect between message accuracy and issue involvement, and therefore message accuracy has a greater impact on Web site credibility for those who are highly involved in the issue, compared to those who are less involved.

Theoretical and Practical Implications

The findings resulting from this online experiment have important implications for online health information. From a theoretical perspective, the present study attempted to investigate the factors influencing the perceived credibility of online diet and nutrition information. Although interest in diet and nutrition has increased, previous studies regarding online health communication typically have explored either overall health issues or have focused

on certain disease such as cancer or diabetes. Therefore, the study helps us understand how people perceive online diet and nutrition information and which factors influence users' perceptions of the credibility of online nutrition information.

Specifically, some of these findings support the results of previous online credibility studies. In particular, prior studies have suggested that both source effects and message effects have a positive influence on Web site credibility, and this study particularly suggests that message accuracy is a more important influence on Web site credibility than source expertise. This may indicate that most people felt qualified to judge the accuracy of the message about whole grain intake. In particular, high involvement in diet and nutrition information seems to raise people's concerns about message accuracy. Therefore, message accuracy is likely to be a priority consideration in determining the credibility of Web sites providing diet and nutrition information.

The present study also offers some essential practical implications. First, the findings confirmed that the Internet is an important source where people learn diet and nutrition information. Consistent with most previous studies, the present study investigated how subjects use online diet and nutrition information and found they usually use the Web sites to fill their desire to get diet and nutrition information. This suggests that dietary professionals should work to ensure that people can easily find appropriate online sources of accurate diet and nutrition information.

Second, despite the importance of online information, there remain several restrictions of using online information. That is, online health information-seekers often have trouble finding appropriate and accurate information because the online world is an unregulated space (Eysenbach, 2008). Some past reports have suggested that the risk of online information-seekers

encountering diet and nutrition *misinformation* is serious (e.g., ADA reports). Holgado and colleagues (1999) have suggested that information providers should create messages carefully in reduce the likelihood of information seekers being confused by what they learn online. The findings of the present study revealed that message accuracy seems to strongly influence Web site credibility. Thus, online health information providers should be particularly conscious of ensuring high message accuracy when they provide diet and nutrition information through Web sites.

In addition, highly credible Web sites encourage people to perceive the information they provide as being of high quality and to make decisions based on that information (Bates, Romina, Ahmed, & Hopson, 2006). In this context, findings related to the factors influencing perceptions of online diet and nutrition information will help online health information providers learn to more effectively manage their messages. Furthermore, well-made Web sites will be more effective in educating people about how to prevent certain disease such as obesity and diabetes caused by poor dietary habits. Understanding how people perceive the credibility of Web sites providing diet and nutrition will assist both information users and information providers in communicating more effectively.

Limitations and Future Research

This study has significant potential contributions, but the study also had several limitations, some of which could be addressed through further research. First, there is a limitation in terms of generalizability. Although college students typically use online information, the subjects recruited in this study were not representative of the entire audience who searches online for diet and nutrition information. Thus, the results of this study must be replicated in other non-student populations. In addition, the present study focused specifically on one element of diet and nutrition -- whole grain intake -- so the findings do not necessarily mean

that the credibility of all online diet and nutrition information will be affected in the same ways by message and expertise cues. Future studies should examine other diet and nutrition topics to reconfirm the effects of source expertise and message accuracy.

Second, since the study was conducted under experimental condition, the findings may reflect artificial and/or short-term effects. In other words, the subjects could be distracted by their circumstances because they were not controlled by the researcher in the present study. Therefore, the future studies need to be repetitively measured by a long-term observation to harden the relationship between variables,

Third, although this study employed some variables related to message and source cues, future research needs to consider other factors that influence how people perceive the credibility of online diet and nutrition information. For instance, knowledge of the content likely is one of the significant factors in determining credibility for web sites related to that content (Eagly & Chaiken, 1993; Eastin, 2001). In other words, there is a possibility that different levels of knowledge mediate users' evaluations of persuasive messages delivered by Web sites. In addition, Houston and Allison (2002) have suggested that health status and physical condition can influence online health information usage. Therefore, future research should examine a wide range of independent variables that seem to impact the perceptions or behavior of online health information seekers.

Finally, the present study explored the relationships among message accuracy, source expertise, and perceived Web site credibility using ANOVA and ANCOVA tests. Additional research is uncover causal relationships among these variables by using other statistical tools such as multiple regression analysis and structural equation model.

Despite some drawbacks of the present study, the study represents a step toward understanding how people perceive online diet and nutrition information and offers a valuable contribution to the development of online health communication practices.

APPENDIX A WEB PAGES STIMULI

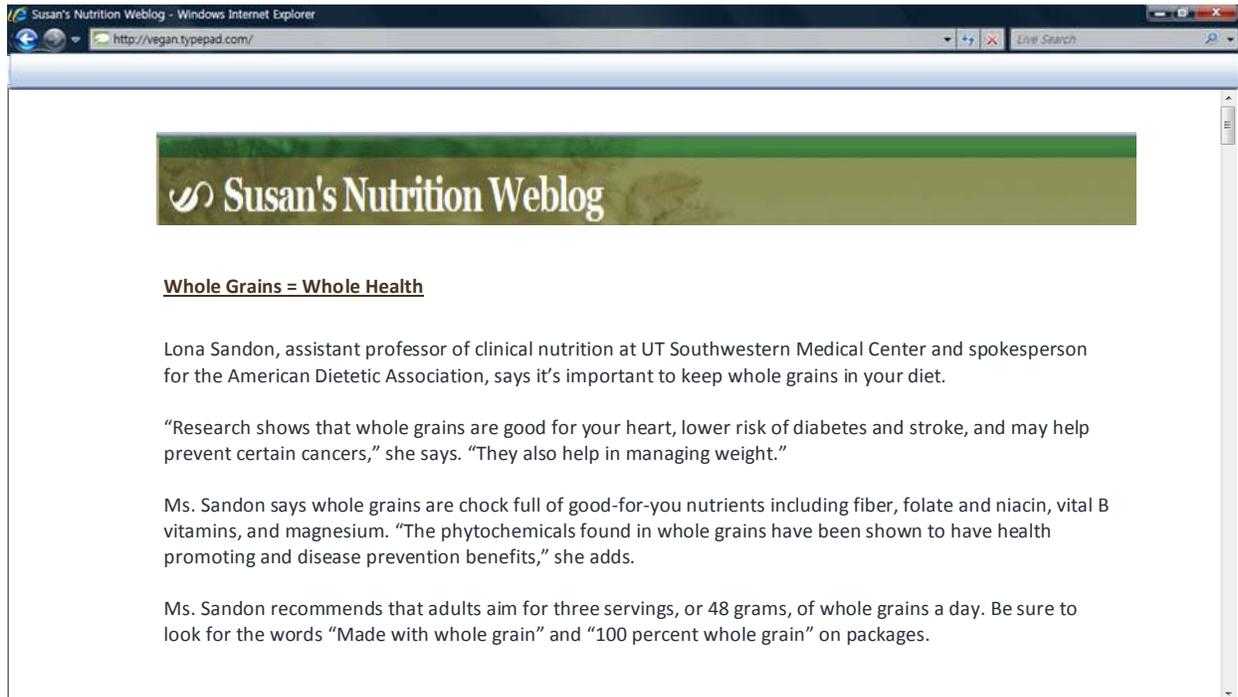
Version 1.

The screenshot shows a web browser window displaying the CDC website. The page title is "Whole Grains = Whole Health". The main content area contains three paragraphs of text. The first paragraph introduces Lona Sandon, an assistant professor at UT Southwestern Medical Center. The second paragraph quotes her: "Research shows that whole grains are good for your heart, lower risk of diabetes and stroke, and may help prevent certain cancers." The third paragraph states that whole grains are rich in fiber, folate, niacin, and B vitamins. The fourth paragraph recommends three servings (48 grams) of whole grains daily, looking for "Made with whole grain" and "100 percent whole grain" on packages. On the right side, there is a sidebar with a search bar, a text size selector (S, M, L, XL), and links for "Email page", "Print page", "Bookmark and share", and "Get email updates". Below these is a "Contact Us" section with the address: "Division of Nutrition, Physical Activity and Obesity, 4770 Buford Highway, NE, MS/K-24, Atlanta GA 30341-3717", phone number "800-CDC-INFO (800-232-4636)", TTY: "(888) 232-6348", and email "cdcinfo@cdc.gov".

Version 2.

The screenshot shows a web browser window displaying the CDC website. The page title is "Whole Grains = Whole Health? Not Necessarily". The main content area contains three paragraphs of text. The first paragraph introduces Lona Sandon, an assistant professor at UT Southwestern Medical Center. The second paragraph quotes her: "Research shows that whole grains don't have much of a health impact on your heart, risk of diabetes and stroke, or likelihood of developing cancer." The third paragraph states that whole grain foods are not significantly different from non-whole-grain foods in terms of their nutrient levels. The fourth paragraph says that researchers do not know yet whether the phytochemicals found in whole grains have health promoting and disease prevention benefits. The fifth paragraph states that it isn't that important for adults to have whole grains every day, as long as they see the phrase "100 percent wheat" on the package. On the right side, there is a sidebar with a search bar, a text size selector (S, M, L, XL), and links for "Email page", "Print page", "Bookmark and share", and "Get email updates". Below these is a "Contact Us" section with the address: "Division of Nutrition, Physical Activity and Obesity, 4770 Buford Highway, NE, MS/K-24, Atlanta GA 30341-3717", phone number "800-CDC-INFO (800-232-4636)", TTY: "(888) 232-6348", and email "cdcinfo@cdc.gov".

Version 3.



Susan's Nutrition Weblog - Windows Internet Explorer
http://vegan.typepad.com/

Susan's Nutrition Weblog

Whole Grains = Whole Health

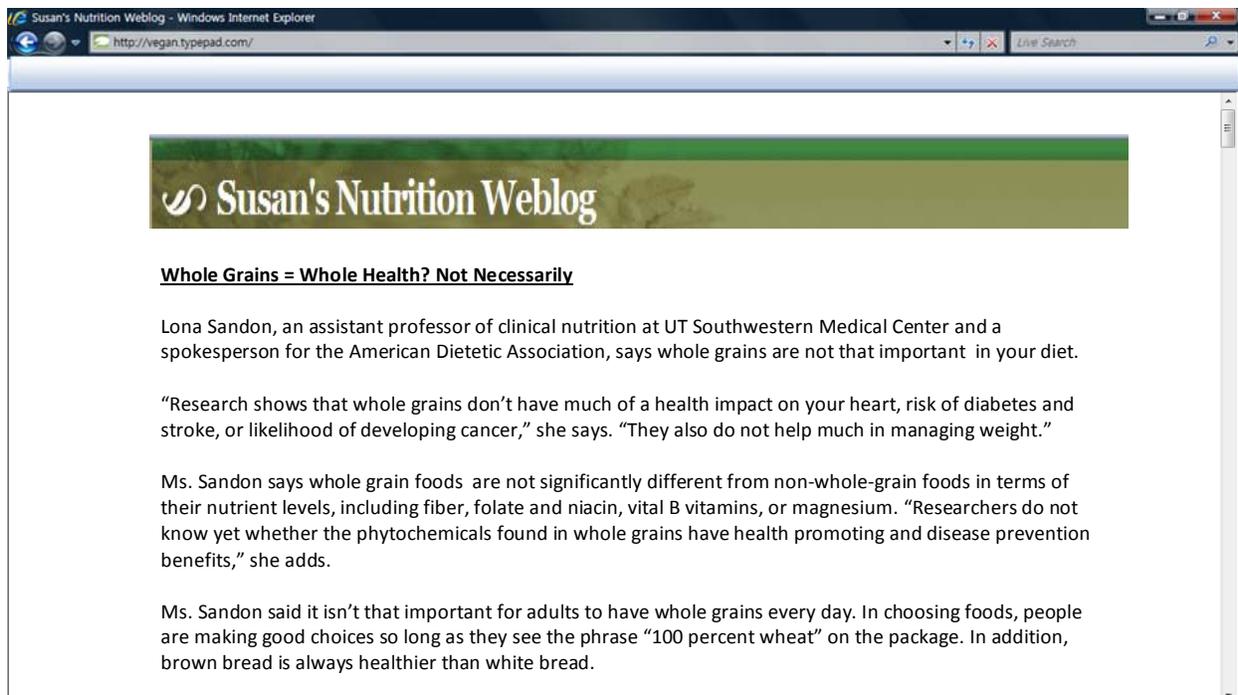
Lona Sandon, assistant professor of clinical nutrition at UT Southwestern Medical Center and spokesperson for the American Dietetic Association, says it's important to keep whole grains in your diet.

"Research shows that whole grains are good for your heart, lower risk of diabetes and stroke, and may help prevent certain cancers," she says. "They also help in managing weight."

Ms. Sandon says whole grains are chock full of good-for-you nutrients including fiber, folate and niacin, vital B vitamins, and magnesium. "The phytochemicals found in whole grains have been shown to have health promoting and disease prevention benefits," she adds.

Ms. Sandon recommends that adults aim for three servings, or 48 grams, of whole grains a day. Be sure to look for the words "Made with whole grain" and "100 percent whole grain" on packages.

Version 4.



Susan's Nutrition Weblog - Windows Internet Explorer
http://vegan.typepad.com/

Susan's Nutrition Weblog

Whole Grains = Whole Health? Not Necessarily

Lona Sandon, an assistant professor of clinical nutrition at UT Southwestern Medical Center and a spokesperson for the American Dietetic Association, says whole grains are not that important in your diet.

"Research shows that whole grains don't have much of a health impact on your heart, risk of diabetes and stroke, or likelihood of developing cancer," she says. "They also do not help much in managing weight."

Ms. Sandon says whole grain foods are not significantly different from non-whole-grain foods in terms of their nutrient levels, including fiber, folate and niacin, vital B vitamins, or magnesium. "Researchers do not know yet whether the phytochemicals found in whole grains have health promoting and disease prevention benefits," she adds.

Ms. Sandon said it isn't that important for adults to have whole grains every day. In choosing foods, people are making good choices so long as they see the phrase "100 percent wheat" on the package. In addition, brown bread is always healthier than white bread.

APPENDIX B
QUESTIONNAIRE

- The following questions ask your knowledge about “whole grains.” Please check “True” or “False” for each statement.

1. Whole grains are better for your health than refined grains.

① True ② False ③ I do not know.

2. Eating whole grains does not increase fiber intake.

① True ② False ③ I do not know.

3. The benefits of consuming whole grains include a reduced risk of stroke, type 2 diabetes, and heart disease. Additionally, whole grain intake helps to control weight gain and prevent obesity.

① True ② False ③ I do not know.

4. Nutrition provided by whole grains has no effect on health.

① True ② False ③ I do not know.

- The following questions ask about your thoughts about whole grain food.

		Strongly disagree						Strongly agree
1	I am concerned about including whole grain foods in my diet.	1	2	3	4	5	6	7
2	Information about whole grain foods is very relevant to me.	1	2	3	4	5	6	7
3	Understanding the value of whole grain foods is important to me.	1	2	3	4	5	6	7

- The following questions ask about your Internet experience.

		Strongly disagree						Strongly agree
1	I frequently use the Internet.	1	2	3	4	5	6	7
2	I have a great deal of experience using the Internet.	1	2	3	4	5	6	7
3	I am expert in using the Internet.	1	2	3	4	5	6	7
4	I am very familiar with the Internet.	1	2	3	4	5	6	7
5	It is easy for me to access the Internet.	1	2	3	4	5	6	7

- Have you ever visited the CDC website (<http://www.cdc.gov/>) before today?
① Yes ② No ③ I do not know.
- Have you ever visited the “Susan's Nutrition” Weblog (<http://vegan.typepad.com/>) before today?
① Yes ② No ③ I do not know.
- The following Web page provides information about “whole grains and health.” Please read the article and answer the following questions. (Please do not use the back button.)

Insert each Web page stimulus

- After seeing the Web site, how would you rate the Web site?

		Strongly disagree						Strongly agree
1	This site provides information that is neutral.	1	2	3	4	5	6	7
2	This site is even-handed in presenting information.	1	2	3	4	5	6	7
3	This site is comprehensive.	1	2	3	4	5	6	7
4	This site is concerned about its visitors.	1	2	3	4	5	6	7
5	This site offers everything you need to know on the topic.	1	2	3	4	5	6	7
6	This site provides information that is balanced.	1	2	3	4	5	6	7
7	This site is slanted in the information it provides.	1	2	3	4	5	6	7
8	This site is ethical.	1	2	3	4	5	6	7
9	This site has my interests at heart.	1	2	3	4	5	6	7
10	This site provides in-depth information.	1	2	3	4	5	6	7
11	This site is biased in the information it provides.	1	2	3	4	5	6	7
12	This site is trustworthy.	1	2	3	4	5	6	7

- After seeing the Web site, how would you rate the Web site sponsor?

		Strongly disagree						Strongly agree
1	This site sponsor is credible.	1	2	3	4	5	6	7
2	This site sponsor has high integrity.	1	2	3	4	5	6	7
3	This site sponsor's reputation is positive.	1	2	3	4	5	6	7
4	This site sponsor is successful.	1	2	3	4	5	6	7
5	This site sponsor is trustworthy.	1	2	3	4	5	6	7

- After reading the message on the Web site, how would you rate the accuracy of message?

Totally inaccurate							Totally accurate
1	2	3	4	5	6	7	

- The following questions ask about your use of diet and nutrition information.

1. What kind of media do you usually use in order to get diet and nutrition information?

_____ Television/Radio _____ Newspapers/Magazines _____ Internet

_____ Health professionals (doctors, nurses, nutritionists, etc.)

_____ Other people (parents, friends, etc.) _____ Others _____

2. How often have you used diet and nutrition Web sites?

_____ Never _____ Once or twice _____ Once a month

_____ Once a week _____ Daily

3. When you search for diet and nutrition information on the Internet, what are your considerations in determining the credibility of the Web site? (open-ended)

- The following questions ask about your health concern.

		Strongly disagree						Strongly agree
1	I am concerned about following a low-fat diet.	1	2	3	4	5	6	7
2	I am interested in weight loss.	1	2	3	4	5	6	7
3	I tend to check the nutrition information about what I eat.	1	2	3	4	5	6	7
4	I am concerned about following a low-carbohydrate diet.	1	2	3	4	5	6	7
5.	I try to follow a low-calorie diet.	1	2	3	4	5	6	7

- The following questions include some basic biographical data about you.

1. Gender _____ Male _____ Female

2. How old are you? _____ years old

3. What is your current level of education?

_____ Freshmen _____ Sophomore _____ Junior
_____ Senior _____ Graduate student

4. What is your current marital status?

_____ Single _____ Married _____ Other

5. What is your ethnic background?

_____ Non-Hispanic _____ Hispanic _____ African American
_____ Asian _____ Other

6. Please write your height and weight.

Height _____ feet _____ inches Weight _____ pounds

Notice!

This message contained in the web site was manipulated for this study. The actual information about whole grain food is as follows. The information below was taken from an American Dietetic Association (ADA) report.

Truth about Whole Grains

- It reduces the risk of heart disease, diabetes and stroke by decreasing cholesterol levels, blood pressure, and blood coagulation.
 - It helps prevent certain cancers.
 - It provides good-for-you nutrients including fiber, folate and niacin, vital B vitamins, and magnesium.
 - Health professionals recommend that adults aim for three servings, or 48 grams, of whole grains a day.
 - It helps in weight control. In other words, people who consume more whole grains consistently weigh less than those who consumed less whole grain products.
-

For more information, please refer to the ADA Web site, <http://www.eatright.org/default.aspx>.

Thank you for your participation! ☺

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BIOGRAPHICAL SKETCH

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