THESIS

ADOLESCENTS AND NUTRITION INFORMATION-SEEKING: THE ROLE OF THE INTERNET

Submitted by

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WE HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER OUR SUPERVISION BY JESSICA NICOLE LARSEN ENTITLED "ADOLESCENTS AND NUTRITION INFORMATION-SEEKING: THE ROLE OF THE INTERNET" BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE.

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ABSTRACT OF THESIS

ADOLESCENTS AND NUTRITION INFORMATION-SEEKING:

THE ROLE OF THE INTERNET

The purpose of this thesis is to examine the ways adolescents find and make sense of nutrition information, giving special attention to the role of the Internet in that process. Adolescents' behaviors and opinions relevant to finding nutrition information were investigated using Kuhlthau's (1993) iterative model of information-seeking as a theoretical foundation. Since many skills are required to search, engage with, and use online information sources and information, the information-seeking process was investigated in relationship to an applied context of eHealth literacy (Norman & Skinner, 2006a), referred to as eNutrition literacy.

From six in-depth interviews and a brief paper-and-pencil questionnaire with seventy-nine adolescents aged 12-16 two trends emerged: 1) these adolescents were primarily presented with and fulfilled nutrition information needs in formal settings such as school and 2) these adolescents used the Internet to fulfill primarily personal needs. Therefore, a conflict existed between the ways they used the Internet and the ways they were presented with a nutrition information-seeking task. Nutrition-specific information literacy, media literacy, health literacy, and scientific literacy, created challenges in stages of the information-seeking process as well. Fundamentally, this affected their

overall engagement with online nutrition information and their ability to receive the maximum benefits from the online information-seeking process.

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Chapter I - Introduction

In today's fast food nation, there is little question that childhood obesity is an issue. Recent estimates put roughly 16 percent of children aged two to 19 years old as overweight (Ogden, Carroll, & Flegal, 2008). Knowing such a powerful statistic, it is difficult to sit idle and hope for change. Obesity rates are rising, not falling, and an important question is: what will reverse this trend?

Education is a predictor of positive health behaviors (Rimal, Flora, & Schooler, 1999) and nutrition education has the potential to change the growing trend of obesity. Teaching adolescents how to make choices about what they eat and drink could give them the confidence to make the nutritional decisions that can influence the rest of their lives. Yet to teach we must first understand, and little is yet understood about the process of how adolescents find and make sense of nutrition information.

Many skills are required in order to engage with the body of nutrition information. Additional skills are necessary to engage with the body of online nutrition information, and these skills may be particularly relevant given that 93 percent of adolescents aged 12-17 use the Internet (Macgill, 2007). Existing research has quantitatively measured if adolescents are using the Internet for health information (e.g., Ackard & Neumark-Sztainer, 2001; Borzekowski & Rickert, 2001a, 2001b, 2000; Rolinson, 1998). *Why* and *how* adolescents seek online health information, including nutrition information, is a question a more qualitative approach can begin to address by considering adolescents

thoughts, opinions, and experiences in their own words. Although this process may be complex, it is helpful to begin by looking at the foundational skills needed to perform an online health search, which notions of literacy can help explain.

This study used a mixed method of questionnaire and in-depth interview data to investigate the question: *How do adolescents find and make sense of nutrition information?* Specifically, the study examined literacy skills in terms of a modified version of Norman and Skinner's (2006a) eHealth literacy model and the relationship of these skills to the various stages of Kuhlthau's (1993) model of information-seeking by looking at the behaviors and opinions adolescents had related to nutrition information. Overall, focus was made toward understanding adolescent's opinions of the use and usefulness of online resources in learning about nutrition. This was in order to gauge if online resources were being used, and why or why not, which in a broader sense served to determine what improvements needed to be made toward the development of online nutrition resources.

Ultimately, this study found that these adolescents lacked experience using the Internet for finding nutrition information. They were usually instructed as to what sources of nutrition information to use, and the Internet was very rarely one of those sources. The way they were presented with nutrition information needs also contributed to adolescents not regularly applying the nutrition knowledge they did possess in their food choices. This phenomenon occurred because the need to use nutrition information rarely arose in their everyday lives. Instead, others, namely parents, were making many of the nutrition decisions for them. In addition, the adolescents had difficulty seeing the long-term effects of what they ate and drank.

A second trend emerged as well: that these adolescents primarily used the Internet to engage in social activities, such as social networking, chatting, and gaming. Therefore, even if they had a more personal nutrition information need, the Internet was not viewed as a place where they would engage in a more informational activity like nutrition information-seeking.

Adolescents' overall inexperience led to roadblocks in the literacy skills necessary to fully engage in the online nutrition information-seeking process. In specific, they lacked effective search strategies to find nutrition information and they did not have a deep understanding of the topic of nutrition to engage with it on a more complex level. Also, although they possessed health and media literacy knowledge, they may not have been often actually applying those skills. Due to these literacy roadblocks and the way they were formally being presented with nutrition information-seeking needs, these adolescents often limited themselves to books when selecting sources, and did not often have the opportunity to engage the skills they said they had to assess the relevance or accuracy of online nutrition information. Ultimately, this affected their overall engagement with online nutrition information and their ability to receive the maximum benefits of an iterative online information-seeking process.

Chapter II - Literature Review

The process of finding information requires various skills, including being able to access and use information sources, understand information, and make decisions about what is relevant. These skills are largely based on notions of literacy, and in the realm of health and nutrition, in an applied context called health literacy. Engaging with health and nutrition information online requires even more skills, including being able to use computers and the Internet in addition to being able to understand the scientific nature of the health and nutrition information being encountered. The presence or absence of these skills may have a marked affect on the information-seeking process (Selber, 2004).

This project aimed to assess the role of these skills within a model of information-seeking that consists of six stages: initiation, selection, exploration, formulation, collection, and presentation (Kuhlthau, 1993). During each of these stages a user participates in a different type of activity or behavior that presents the opportunity for different literacy skills to be used or for the lack of these skills to inhibit full engagement in the information-seeking process.

Although there are many potential barriers, being able to find and make sense of nutrition information is an important ability for adolescents to have. Ultimately, engaging in nutrition information-seeking can provide adolescents the knowledge and skills necessary to make healthy food choices throughout their lives. The following chapter discusses a theoretical foundation and relevant previous literature related to

exploring information-seeking behavior as well as the literacy skills needed to be successful.

The Importance of Nutrition Information for Adolescents

Previous research has recognized the need to create programs for adolescents that emphasize skills-building for healthy nutrition and weight control (Middleman, Vazquez, & Durant, 1998). Research has also been done that suggests it will be worthwhile to create information programs that teach adolescents how to make nutritionally-sound choices, given that they are exposed to such a wide variety of food options each day (Cusatis & Shannon, 1996). Since education is a predictor of positive health behaviors (Rimal et al., 1999), nutrition education through the school system, or other sources, is an important tool to employ to slow the rising rate of childhood obesity.

Childhood obesity is often indicative of obesity in adulthood (Ferraro, Thorpe, & Wilkinson, 2003); therefore, nutrition education is especially important for adolescents and children. In the earlier stages of cognitive development, adolescents and children are refining their abilities to make choices about what they eat and drink (Valkenburg & Cantor, 2001). Therefore, being educated to make nutritionally-sound choices in adolescence also has the potential to influence the ability to make nutritionally-sound choices throughout the rest of life. Nutrition information is not only relevant for overweight adolescents, but may also be of particular interest for adolescents who have body image concerns (Rasnake, Laube, Lewis, & Linscheid, 2005) or who are young athletes (Petrie, Stover, & Horswill, 2004).

In addition to the formal education system, possible sources of nutrition information include books, magazines, doctors, friends, family, and the Internet. Each of

these sources has the potential to provide helpful nutrition information to adolescents, and it is possible for each source to provide that information with a different perspective (this, in turn, can be helpful in teaching adolescents to make *choices* by discerning which information they deem relevant). However, since so many adolescents depend on the Internet as a primary information source (Lenhart, Rainie, & Lewis, 2001; Lenhart, Simon, & Graziano, 2001), it is important to pay special attention to the role the Internet plays in the dissemination of nutrition information to adolescents.

The Process of Seeking Information

Theories of information-seeking can be helpful in understanding the process of how adolescents find and make sense of nutrition information. Information-seeking theories have evolved over time as researchers have considered different ways users might look for information and achieve their goals. However, a common component throughout information-seeking literature is that the user has a specific goal or task to accomplish, such as finding nutrition information.

Information is "anything that can change a person's knowledge" (Marchionini, 1995, p. 5). An information source, sometimes called a search system, is a person, document, or location that contains these "things" (e.g., symbols, words, pictures) that can change a person's knowledge. Information-seeking is thus the process of pursuing and making sense of these sources, where a user's task is to change his or her state of knowledge (Marchionini, 1995).

A popular model of information-seeking during the 1980's focused on the user, need, uses, and user behaviors (Hayden, 2002). Wilson (1981) outlined a process of information-seeking that begins with a user perceiving an information need as the result

of a particular environment or event. The user then searches for information by using a variety of sources and employing information-gathering strategies, which leads to the user's perceived success or failure. The process may be repeated if the user fails, or does not fulfill his or her original perceived need, and may end if the user succeeds by fulfilling this need. What this model lacks is a representation of the iterative nature of information-seeking (Hayden, 2002). It presents information-seeking as a linear process which culminates in a single perceived need being successfully met and does not allow for the user's active engagement and learning during the process.

A newer approach to information-seeking focuses on transferable cognitive skills that can be developed to increase the effectiveness of using information (Hayden, 2002). Kuhlthau (1993, 1991) developed such a model of the information search process that accounts for the physical actions of the user as well as the user's cognitive thoughts and affective feelings. In this model, information-seeking is an active process where new understanding is constructed as information is encountered (Kuhlthau, 1999). Thus, perceived needs can be altered as the user discovers new information. Kuhlthau's (1993) model of the information search process includes six stages: 1) initiation, or where users become aware that they need information; 2) selection, where topics and approaches are selected; 3) exploration, where preliminary searching of a broad topic occurs; 4) formulation, where a topic is narrowed; 5) collection, where information on the narrowed topic is gathered; and 6) presentation, where the information is used in some way. Each stage represents a task in the information-seeking process and focuses on how users make sense of information as they encounter it. A user is not confined to move between the

stages in a particular order, instead the order is dependent upon how perceived needs are met or modified as information is encountered.

Online Nutrition Information-Seeking

Previous research has identified the need for the strategies that aim to change adolescents' nutrition behavior to be wide-reaching (Neumark-Sztainer, Story, Resnick, & Blum, 1998). The Internet has the potential to serve this function by providing nutrition information to a large number of adolescents very quickly and with little cost compared to more traditional methods of health communication (e.g., doctor visits, books, and classroom instruction). Since adolescents are frequent online visitors, it is likely that the Internet could be this powerful arena for the dissemination of nutrition information. Therefore, it was essential for this project to understand what role the Internet plays in the search for nutrition information.

It has been suggested that adolescents do use the Internet to obtain health information, although this may be a small portion of their total time spent online. Borzekowski and Rickert (2001b) found that 42 percent of health center participants aged 12-21 and 43 percent of high school participants in grades 9-12 had attempted to get health information from the Internet. Similarly, another study found that 44 percent of urban adolescent girls had tried to get health information from the Internet (Borzekowski & Rickert, 2000). A national telephone survey of 1,209 youth found that 75 percent of 15-24 year olds who have ever gone online have gotten health information at least once (Rideout, 2001). Rideout found that this is more than the 46 percent of youth who have ever gone online to check sports scores, the 50 percent who have bought something online, and the 67 percent who have participated in an online chat room. This suggests

that health information-seeking adolescents do utilize online resources and that most adolescents have probably sought health information online at some point.

Although research is limited, available data has suggested that obtaining nutrition information online may be a growing trend among members of the adolescent population. Rolinson (1998) suggested that diet and food information online would be the second most anticipated need, next to sports and exercise information, for adolescents aged 13-16 in the coming years after his research was conducted. Other research suggested that 31 percent of 12-17 year olds have gone online to look for health, dieting, or fitness information (Lenhart, Madden, & Hitlin, 2005). Borzekowski & Rickert (2001a) found that 36 percent of a sample of health center patients, aged 12-21, and high school students in the 9^{th}-12^{th} grades had gotten information on diet and nutrition online. Other studies have found that 43 percent of adolescent online health information seekers have gotten information on diet and nutrition (Borzekowski & Rickert, 2000) and 63 percent have used the Internet to get information about body image and nutrition (Skinner, Biscope, Poland, & Goldberg, 2003).

Although data supports the idea that adolescents use the Internet to get health information, including nutrition information, some data has suggested that they might not prefer this approach over traditional approaches (e.g., doctor visits, books, and classroom instruction). Rolinson (1998) found that although 94 percent of students aged 13-16 rated health information as 'very important' or 'quite important', only 3 percent of survey respondents had used the Internet to get that information, and only 9 percent preferred the Internet to get health information.

Others have suggested that adolescents could prefer an online approach for health information, including nutrition information, because it offers privacy (Gray, Klein, Cantrill, & Noyce, 2002; Morris, 2001; Rideout, 2001), anonymity (Gray, Klein, Noyce, Sesselberg, & Cantrill, 2005a), and reduces embarrassment (Skinner et al., 1997, 2003). Thus, adolescents can avoid the anxiety associated with asking health professionals and peers uncomfortable questions, as well as avoid being perceived as ignorant for asking questions they feel they should already know the answers to. Similarly, personalization has been cited as a benefit of obtaining health information online (Gray et al., 2005a; Goold, Ward, & Carlin, 2003). Previous research suggests that tailored messages appeal to adolescent users, perhaps because they do not have to sift through irrelevant information and find sources better suited to their own language and style.

Although it is not certain if they prefer an Internet approach, adolescents who *do* use an Internet approach are likely to be multi-tasking as they search for nutrition information. The existing research strongly suggests that adolescents will do many things online at once (Gross, 2004; Gross, Juvonen, & Gable, 2002; Lenhart & Rainie et al., 2001), such as online games, instant messaging, downloading music, reading and creating blogs, and downloading videos (Jones & Fox, 2009). For example, an adolescent searching for nutrition information may also be chatting with friends and downloading online videos at the same time.

Doing multiple things online at once has the potential to decrease the focus these adolescents could give to engaging in the information they are encountering, which could affect the information-seeking process. For example, this behavior might slow the information-seeking process, which in turn could cause adolescents to prefer other

sources that deliver the information more quickly. Multitasking could cause difficulty in adolescents focusing their thoughts and narrowing their search topics, since they may have to revisit information several times if they are intermittently being distracted or pulled away from the information.

Application of Kuhlthau's Model of Information-Seeking

An iterative model of information-seeking such as Kuhlthau's (1993) is likely to represent the way adolescents seek nutrition information, particularly the way they seek that information online. Most adolescents probably seek out nutrition information for learning purposes (Kuhlthau, 1988), although they may be motivated to do this by a variety of factors. For example, an adolescent male may set out to learn if it is healthy to eat a lot of pasta, since it is one of his favorite foods. The information he encounters might cause him to alter his original need as he discovers that foods from the grain group, such as spaghetti, contain carbohydrates, which have positive and negative benefits for different people. He may then alter the focus of his search to finding out what carbohydrates are and how they affect the body. He may also create more information needs, as he finds himself with more questions based on his exposure to this information, and multiple needs may then have to be met.

An information-seeking model like Kuhlthau's that focuses on how seekers engage with the process and modify their needs accommodates non-linear processes. Non-linear processes are especially representative of the way the Internet presents information, given that there is no one specific starting place or series of steps to retrieving information. Rather, users can start at any one of thousands of starting places,

or Web sites, and follow a long train of information that is unique to their personal engagement with the information.

Marchionini (1995) discussed the information-seeking process applied specifically to the electronic environment. When users seek information in an electronic environment, they are presented with new challenges, such as great volumes of information and new technologies, and their expectations about what kinds of information they will receive, how they will retrieve it, and how that information can be used changes. The electronic environment is conducive to receiving an enormous amount of information at once with immediate access, but this also allows users to engage with the information in new ways, such as having freedom to quickly perform very specific searches or to browse across multiple documents at the same time. Ultimately, the Internet encourages users to participate in the information-seeking process in a dynamic and interactive manner.

Kuhlthau's model of information-seeking was developed using interviews (Kuhlthau, 1993) in order to deeply understand the cross of feelings, thoughts, and actions in the information-seeking process both cognitively and affectively. In contrast, Marchionini's application puts less focus on how dynamic external influences add to the process. Kuhlthau's model more effectively addresses the goal of this study to understand adolescents' underlying behaviors and opinions related to nutrition, therefore it is used as a theoretical framework to examine the process of how adolescents find and make sense of nutrition information, giving special attention to how they find and make sense of online nutrition information.

This concept of "sense-making" focuses on how people "construct sense of their worlds and, in particular, how they construct information needs and uses for information in the process of sense-making" (Dervin, 1983, p.1). In other words, sense making includes internal thoughts as well as external actions and behaviors in relation to how people interact with their world. The current study focuses on how people interact with nutrition information, both online and from other sources. Dervin points out that information-seeking is central to the concept of sense-making, as both are vital to understanding an individual's process of communicating. Thus, this project considered it vital to understand how adolescents find and make sense of nutrition information, particularly online nutrition information, in terms of the information-seeking process.

Stages of Information Seeking

The present project aimed to understand each stage in the process of adolescents finding and making sense of nutrition information by utilizing the framework presented in Kuhlthau's (1993) model of the information search process. The stages of this model will be individually presented. In order to illustrate the theoretical foundation of this project, relevant existing research will be integrated into the discussion of the behaviors or outcomes characteristic of the stages where applicable, and particular application to online environments will also be discussed.

Initiation.

Task initiation is the first stage in the information-seeking process. During this stage, users recognize that they have an information need (Kuhlthau, 1991). This is the stage where an adolescent identifies that he or she has a question to answer about nutrition. Possible reasons for identification of this need could be, but are not limited to,

a teacher assigning a project or because of conversations with friends, family, or teachers. During initiation an adolescent might discuss possible topics or approaches to finding this information.

Different motivators could point adolescents toward different nutrition-information sources, which could then explain if and why adolescents prefer different nutrition information sources over others. For instance, an adolescent could prefer books for looking up nutrition information for homework, but prefer parents for obtaining nutrition information related to what she ate for dinner. Existing research has not established a list of possible motivations for initiating a nutrition information search; therefore, motivations for initiation were important for the present research to address.

Selection.

During the second stage of the information-seeking process, a specific topic is selected. The approach for finding information about this topic is also selected. For instance, during this stage an adolescent may decide to search for information about pasta and also decide to conduct the search online. Action taken during this stage may also include this adolescent talking with others about the topic as well as the specific approach to information searching.

This is the stage where mental models may become most important. Some researchers suggest that information-seeking is a cognitive process that utilizes mental models (Marchionini, 1995). Users have mental models for how various information sources (e.g., books, online materials) are used and what they offer. As users encounter new topics or approaches to seeking information, new mental models are developed. Generally, users will utilize mental models about and therefore select the topics and

approaches that they are confident they can use to succeed in fulfilling their information needs (Kuhlthau, 1991).

There are many approaches to obtaining health information. Some examples include parents, friends, health professionals, media, and the Internet (Ackard & Neumark-Sztainer, 2001). Therefore, it was important to address what approach adolescents prefer. Little existing literature makes suggestions about approaches to nutrition information-seeking specifically. Instead, nutrition might be considered an applied context of preferences in health information-seeking, yet there are still discrepancies in the understanding of adolescents' source preference for obtaining health information. In addition, it was important for the present research to understand if adolescents prefer certain sources (e.g., books, friends, family, or the Internet) and thus possibly possess confident mental models about seeking nutrition information using those sources.

Exploration.

Exploration is the third stage of the information-seeking process and is the stage where information about the general topic is sought out (Kuhlthau, 1991). Here is where the example adolescent may experience doubt about what information he needs to find to fulfill his need to know if pasta is healthy for him to eat in quantity. The information-seeking literature calls this doubt "uncertainty." Kuhlthau (1993) describes uncertainty as a "cognitive state that commonly causes affective symptoms of anxiety and lack of confidence" (p. 111). Levels of uncertainty can change as the user moves between the stages of the information search process. However, it has been suggested that uncertainty

is at its highest at the beginning of the search process, but as the user encounters more information uncertainty decreases.

During this stage, various strategies can be employed to search for information. For instance, different questions may be asked and information relating to different terms may be explored. Existing research does not thoroughly address how adolescents come up with the questions or terms they will use during a nutrition information search, nor when the Internet is used as the preferred approach to online nutrition information-seeking. Therefore, it is important to investigate these habits.

Formulation.

The fourth stage of the information search process is formulation. During this stage, the uncertainty felt during exploration should decrease because enough information has been encountered to allow users to form a focus from their general topic of exploration. This stage is referred to as the turning point of information-seeking (Kuhlthau, 1993). There is not necessarily a single moment of change from exploration to focus, however. It may better be described as a transition between exploration and formulation as the user makes choices about what he or she deems relevant.

New information is assimilated into existing knowledge and mental models may be altered. Finding a focus can be difficult if users have difficulty making this assimilation or adapting their existing models. Ultimately, adolescents' novelty when searching for nutrition information could make this stage more difficult; particularly when considering the fact that the Internet can provide an overwhelming amount of information. Therefore, adolescents may find it especially difficult to sift through nutrition information they find online.

Collection and Presentation.

Collection is where the user efficiently gathers information related to the focus decided upon during formulation (Kuhlthau, 1991). Uncertainty decreases even more during this stage as more relevant information is encountered. The user thus becomes confident that the information they are encountering is relevant to meeting their needs. Online information may be especially efficient for the collection process since information is so proximal (Marchionini, 1995).

In the final stage of the information search process, presentation, the user completes the search and prepares to use the information that was found (Kuhlthau, 1991). Previous research does not explore how adolescents use nutrition information after it is collected. However, understanding use is undoubtedly necessary for the creation of effective nutrition resources. Furthermore, existing research does not indicate if adolescents use online nutrition sources differently than other sources, which could be a possibility. The present research found it especially important to investigate this, given that online information is presented and accessible in an entirely different way than many other sources, including books, teachers, and parents.

The Relationship of Health Literacy to the Information-Seeking Process

A user's ability to progress through these stages of the information-seeking process and preference for an information-seeking approach may have a lot to do with literacy. The collection of a user's mental models (called information infrastructure), is said to be analogous a user's information literacy (Marchionini, 1995). Similar to the concept of information literacy, as more information is encountered a user's information-seeking skills can improve. If literacy is integral to the information-seeking process, it is

also integral to the creation of nutrition resources. The present project considered literacy in this manner, and aimed to understand the relationship of literacy to the information-seeking process. Gaining an understanding of an audience's health literacy can help the developers of nutrition resources (of particular interest to this project is nutrition Web sites) to provide the type of information that is needed and most usable. Having a sense of adolescents' level of literacy applied to a health situation such as nutrition will provide a baseline for the creation of these resources.

Health Literacy

Literacy is defined by Irwin S. Kirsch in conjunction with the Educational Testing Service (2001) as "an advancing set of skills, knowledge, and strategies that individuals build on throughout their lives in various contexts and through interaction with their peers and with larger communities in which they participate" (p. 4). More specifically, "literacy is using printed and written information to function in society, to achieve one's goals, and to develop one's knowledge and potential" (Kirsch, p. 6). The term "health literacy" has been defined as the mediating factor between a health situation and an individual's level of literacy (Nielsen-Bohlman, Panzer, & Kindig, 2004). Thus, in order for an individual to be successful in a health situation, such as seeking nutrition information, he or she is required to have a basic understanding of how to read, speak, and write, as well as a basic understanding of nutrition. Individuals can build their health literacy as they interact with their peers and communities and experience different health contexts. Finally, health literacy is employed when an individual needs to perform a specific health function (Nielsen-Bohlman et al., 2004), such as finding nutrition information.

A number of studies have discussed the various ways an individual's health literacy is necessary to his or her ability to function in a health context (e.g., Eysenbach & Jadad, 2001; Gray, Klein, Noyce, Sesselberg, & Cantrill, 2005b; Nielsen-Bohlman et al., 2004; Nutbeam, 2000, 1998). Nutbeam (1998) used the following definition of health literacy, which he developed in association with the World Health Organization:

> Health literacy implies the achievement of a level of knowledge, personal skills, and confidence to take action to improve personal and community health by changing personal lifestyles and living conditions. Thus, health literacy means more than being able to read pamphlets and make appointments. *By improving people's access to health information and their capacity to use it effectively, health literacy is critical to empowerment.* Poor literacy can affect people's health directly by limiting their personal, social, and cultural development, as well as hindering the development of health literacy. (p. 357, emphasis added)

This approach emphasizes the benefit that health literacy has on improving access and ability to use health information, including nutrition information.

Noting the challenges associated with providing health information and utilizing this definition, Nutbeam (2000) interpreted health literacy in a way that emphasized both its individual and communal nature and distinguished among three levels:

1) *Functional health literacy*. At this level, individuals receive basic health information.
2) *Interactive health literacy*. At this level, individuals develop the skills to act independently on the health knowledge they have received.
3) *Critical health literacy*. At this level, the individual, as well as the community, have the capacity to act on social and economic determinants of health.

Deficiencies at any of these levels can influence how a health situation will manifest. Low literacy levels may result in less developed skills to act upon health information,

which could cause a domino effect leading to poor health, lower income, and a continued decrease in access to the services and technologies providing the health information (Eysenbach & Jadad, 2001). Individuals with low health literacy may also be less likely to know about health-promoting behaviors or use preventative services (Nielsen-Bohlman et al., 2004). These are yet more ways the developers of nutrition resources can benefit from understanding their audience's level of health literacy. If users of nutrition resources are encountering difficulties because of their health literacy levels, it will be necessary to change the type or manner in which nutrition information is provided.

Gray et al. (2005b) explored adolescent health literacy in relation to Internet use and found that difficulties in health information searching could be associated with deficiencies in functional, interactive, and critical health literacy skills:

1) *Functional health literacy*. Participants noted having difficulty searching for health information because they could not spell health terms.
2) *Interactive health literacy*. A lack of guidance from parents, educators, or health providers was recognized; and increased guidance could improve adolescent's access to a greater number of Internet health sources.
3) *Critical health literacy*. The volume of search engine results was found to be a barrier, as was Web site trustworthiness and appropriateness of material to different adolescent age groups.

In order to receive the greatest benefit from Internet health services, adolescents need to be proficient in each of these literacy levels. This suggests that health literacy is strongly related to adolescents' success in using the Internet to seek health information, including nutrition information.

eHealth Literacy

Whether it is adolescents or adults who are obtaining health, or specifically nutrition, information, medical information that is online is referred to as eHealth (Eysenbach, 2001). Eysenbach defines eHealth as follows:

> e-health is an emerging field in the intersection of medical informatics, public health, and business, referring to health services and information delivered or enhanced through the Internet and related technologies. In a broader sense, the term characterizes not only a technical development, but also a state-of-mind, a way of thinking, an attitude, and a commitment for *networked, global thinking, to improve health care locally, regionally, and worldwide by using information and communication technology.* (p. e20, emphasis added)

Eysenbach's definition has been adopted by at least 87 Internet eHealth sources and, overall, is considered to be the most commonly cited definition (Oh, Rizo, Enkin, & Jadad, 2005). Similar to Nutbeam's (2000) definition of health literacy, Eysenbach's definition of eHealth emphasizes the global affect of online health information and highlights the potential that using technology to provide health information has to impact individuals as well as larger communities. Eysenbach's idea suggests that using technology to promote nutrition information can have these same kinds of benefits.

With this said, it is important to note that using a computer to seek nutrition information requires skills in addition to those needed to seek the same information from traditional health sources (e.g., doctor visits, books, and classroom instruction). Additional skills include knowing how to use a computer and the Internet (Norman & Skinner, 2006a). Marchionini (1995) also suggests this in his discussion of information-seeking in electronic environments, noting that users are presented with new challenges, such as great volumes of information and new technologies, and users will need specific skills to be able to deal with these factors. These skills combined with traditional health

literacy produce eHealth literacy, or what Norman and Skinner describe as "the ability to seek, find, understand, and appraise health information from electronic sources and apply the knowledge gained to addressing or solving a health problem" (p. e9).

Norman and Skinner (2006a) developed a model of eHealth literacy that requires six basic skills: traditional literacy, health literacy, information literacy, scientific literacy, media literacy, and computer literacy. These literacies are arranged into a lily model, where each of the petals (literacies) supports the pistil (eHealth literacy) (Figure 1). In other words, a basic level of each of these literacies is needed to function optimally in an online health information-seeking situation.

The literacies are divided into two subgroups: analytic (traditional literacy, information literacy, and media literacy) and context-specific (health literacy, scientific literacy, and computer literacy). Analytic literacies require skills that can be applied to a variety of situations, while context-specific literacies require skills that may vary depending on the circumstance (Norman & Skinner, 2006a). For example, a different level of computer literacy may be needed for an individual to gather information about nutrition on his or her home computer than is needed to gather the same information on a computer at the local library. In this example, the individual's traditional literacy (analytic) remains constant across both situations, but that individual's computer literacy (context-specific) may be different for each type of computer used.

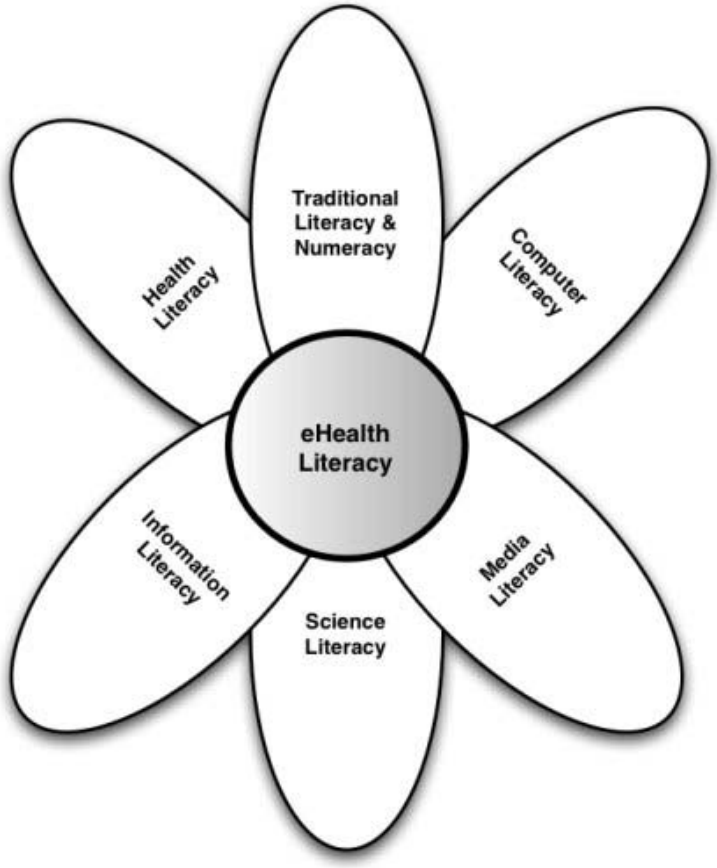

Figure 1. The lily model contains six unique literacy types which combine to create eHealth literacy (Norman & Skinner, 2006a).

Similar to the process of information-seeking, eHealth literacy is a dynamic, "process-oriented skill that evolves over time as new technologies are introduced and the personal, social, and environmental contexts change" (Norman & Skinner, 2006a, p. e9). In terms of this model, when adolescents use the Internet to obtain nutrition information, they must be able to read the information that is presented online (traditional literacy), know what resources are on the Internet and be able to develop search strategies to find the information they desire (information literacy), consider how the media influences the information they are being exposed to (media literacy), have the skills to make the correct health decisions (health literacy), have the ability to use a computer in the ways needed to

find the information they desire (computer literacy), and know the limitations and benefits of the scientific information they find (scientific literacy) (Norman & Skinner, 2006a). Adolescents can build their eHealth literacy as they interact with their peers, communities, and new technologies and experience different health contexts. In a sense, adolescents even build their eHealth literacy as they go through the process of seeking nutrition information online.

Foundations of Norman and Skinner's eHealth Literacy Model

Norman and Skinner's model has the potential to reveal whether adolescents are having difficulty during the information-seeking process. Possible examples of difficulties adolescents might face include:

1) Being unable to read the text that a nutrition Web site provides because it is written at a text level that is too advanced (traditional literacy)
2) Not knowing which Web sites will provide nutrition information (information literacy)
3) Trusting nutrition information from Web sites that are sponsored by food companies whose goals are to promote their products instead of to provide unbiased nutrition information (media literacy)
4) Being unaware of the impact that specific nutrition choices will have on the body (health literacy)
5) Being unskilled in the computer software (e.g., operating system, Internet browser) installed on the computer being used when trying to find nutrition information online (computer literacy)

6) Thinking that since the nutrition information found is from a credible study or organization it is accurate, instead of knowing that there may be other credible studies or organizations that support opposing information (scientific literacy)

This model, and these possible difficulties, are based on self-efficacy and emerge from social cognitive theory; and thus are governed by both personal and environmental influence (Bandura, 1991, 1986). In other words, an adolescent's capacity to use the Internet to find and use nutrition information is governed by how confident that individual is in his or her ability to find nutrition information online (i.e., self-efficacy) as well as how that individual is influenced by other people (e.g. family, friends, teachers, and media). This is very similar to Kuhlthau's association of uncertainty with the process of information-seeking.

Previous research has established a relationship between self-influence, or self-efficacy, and the use of computers for nutrition information (Anderson, Winnett, Wojcik, Winnett, & Bowden, 2001). Anderson et al. (2001) found that self-efficacy, or an individual's belief in his or her capability to organize and execute an action (Bandura, 1986) such as finding nutrition information online, was positively related to the use of computers for nutrition information; and that computer nutrition interventions could be more successful by targeting self-efficacy beliefs. In addition, Eastin and LaRose (2000) found a positive relationship between general Internet use and self-efficacy, with prior Internet use as the strongest predictor of Internet self-efficacy. These findings support an eHealth literacy model that focuses on self-efficacy. Norman and Skinner's (2006a) eHealth literacy model was built to measure perceived levels of traditional, information,

media, health, computer, and scientific literacy, which, in other words, is measuring self-efficacy beliefs.

Social cognitive theory also suggests that how an individual functions in a nutrition information-seeking situation can be partly determined by external influences (Bandura, 1986), including social interactions, the media, and personal experiences. According to social cognitive theory, how an adolescent will use the Internet to seek nutrition information can be predicted by his or her experience with the Internet and nutrition information, as well as how others reinforce his or her nutrition information-seeking behavior. Therefore, the various stages of Kuhlthau's information search process could be influenced by external as well as individual factors.

Research Questions

Overall, the online nutrition information-seeking process may be influenced by a variety of factors, namely the specific components of Norman and Skinner's (2006a) eHealth literacy model (traditional, information, media, health, computer, and scientific literacies). Each stage of Kuhlthau's (1993) information-seeking model presents unique opportunities for strengths or deficiencies in adolescents' eHealth literacy to be impacting the overall information-seeking process. The present research aimed to explore the relationship of eHealth literacy to each of these information-seeking stages individually and therefore presented research goals related to each stage.

To gain an understanding of why adolescents initiate a nutrition information-seeking task using a variety of sources, including the Internet, research goal 1 was presented:

Research Goal 1: What motivates adolescents to initiate a nutrition information search (e.g., recognize the need for information)?

Once adolescents have initiated a search, they will need to select an approach to finding information. With respect to nutrition information, little is known about preferred approaches, therefore research goal 2 was presented:

Research Goal 2: What approach(es) do adolescents prefer (e.g., books, friends, family, or the Internet) to use to obtain nutrition information?

Since it is known that adolescents use the Internet for other activities, they may prefer the Internet for obtaining nutrition information; however, given the unique nature of the Internet as an information resource (e.g., the great volume of information and the additional skills needed to successfully manage it), adolescents may not actually prefer online nutrition resources. To investigate their specific opinions about nutrition information sources in the electronic environment, research goal 2a was presented:

Research Goal 2a: Why is the Internet or why is the Internet not the preferred approach to use to obtain nutrition information?

Once they are exploring for nutrition information, adolescents will likely have strategies for finding information, such as how they select the terms they actually search for. Therefore, research goal 3 was presented:

Research Goal 3: How do adolescents select the questions or terms they will use when exploring for nutrition information?

The Internet has unique search functionalities that other resources, such as books or person-to-person information retrieval, do not have. Therefore, the terms used or questions asked when searching may be markedly different, particularly given search

engine functionality for Web sites. For instance, searching in a library for books, magazines, or newspaper articles may require a very specific search term in order to find a relevant resource. Searching online in a search engine, however, could allow adolescents to use more general questions, perhaps even in full sentences to easily find a relevant resource. To investigate these differences, research goal 3a was presented:

> **Research Goal 3a**: Do adolescents select the questions or terms they will use when exploring for nutrition information online differently than when selecting question or terms for exploring other resources?

After exploring information, adolescents should be able to formulate a focus from the information they have encountered. Given the scientific nature of some nutrition information, adolescents could see this process as tedious or difficult. Therefore, research goal four was presented:

> **Research Goal 4**: Do adolescents find it easy or difficult to decide what information is important during a search for nutrition-information?

The electronic environment presents large amounts of information at once, some of which is created by professionals and other information that is created by lay-people. Web sites containing opinion and fact can be mixed in online search results. Therefore, adolescents may view the ease of using the Internet to find nutrition information differently. Thus, research goal 4a was presented:

> **Research Goal 4a**: Is it more, less, or similarly difficult for adolescents to decide what online nutrition information is important?

Finally, once information is acquired, it is likely used in some way. This could be for, but is not limited to, a school project, homework, personal knowledge fulfillment, or to make a food choice. Therefore, research goal five was presented:

Research Goal 5: How do adolescents use the nutrition information they find? Since online resources can present a mix of fact and opinion, it could be that the type of nutrition information being retrieved from the Internet is used in a different way. For instance, advice from a blog might be used to make a food choice, while facts from a book might be used to complete a homework assignment. To investigate this, research goal 5a was presented:

> **Research Goal 5a**: Do adolescents use the nutrition information they find online differently than nutrition information they find from other sources?

Since skills that are part of overall eHealth literacy have the potential to explain the why and how adolescents seek nutrition information online, the relationship of eHealth literacy, or for this study an applied context of eNutrition literacy, was specifically explored:

> **Research Goal 6**: How is eNutrition literacy related to the process of searching for nutrition information online?

Overall, this project aimed to investigate how and why adolescents find and make sense of nutrition information. Adolescents' opinions and behaviors regarding nutrition information have the potential to explain how they are, or are not, engaging in the nutrition information-seeking process. Furthermore, the relationship of eNutrition literacy can help apply their thoughts and behaviors to electronic environments

specifically. Ultimately, a singular research question was presented in order to assess adolescents' overall relationship with nutrition information-seeking:

> **Research Question**: How do adolescents find and make sense of nutrition information?

A practical benefit of understanding this process is the increased ability to create effective nutrition resources for adolescents, since understanding the target population for any resource is necessary. It also assists in being able to provide adolescents instruction and training in finding and understanding nutrition resources, in a manner in which they will be receptive.

Chapter III - Research Method

This research explored the process of adolescents seeking nutrition information and the special role the Internet played in that process. To flesh out how and why a select group of adolescents find and seek nutrition information and gain a deeper understanding of the role of the Internet, a constant comparative technique was used to analyze six in-depth, face-to-face interviews. This resulted in descriptions of how nutrition information-seeking fit into the lives of the participants as well as their feelings and perspectives about the role of the Internet in the process of information-seeking. To give context to the interview data and evaluate eNutrition literacy levels, a pencil and paper questionnaire was also given to 79 adolescents aged 13-16 that assessed eNutrition literacy, opinions about nutrition and the Internet, and gathered demographic information.

Methods of data collection in previous studies of adolescent Internet use for health information include paper surveys (e.g., Ackard & Neumark-Sztainer, 2001; Borzekowski & Rickert, 2001a, 2001b, 2000; Rolinson, 1998), focus groups (e.g., Goold et al., 2003; Gray et al., 2005b, 2002; Skinner et al., 2003), telephone surveys (e.g., Rideout, 2001), website evaluation (e.g., Skinner et al., 1997), and behavior observation (e.g., Hansen, Derry, Resnik, & Richardson, 2003). Although none of the related previous research has used in-depth interviews, interviews have been cited as the most commonly used research method in health-care settings, because health care researchers can remain closely associated with the clinical tasks being studied (Britten, 2006). The mixed methodology used in this study provided insight into the process of seeking nutrition

information. The survey used demographic characteristics in order to give context to the information-seeking process and evaluate eNutrition literacy levels so the data could be effectively applied to the creation of online nutrition resources.

Procedures

Interviews

In order to gain a deeper understanding of how and why a select number of participants find and make sense of nutrition information in different ways, interview participants were selected from questionnaire respondents according to the following criteria, which emerged from the objectives of the research:

1. Participants were aged 13-15 and in grades seven, eight or nine
2. Participants were currently enrolled in and/or had been previously enrolled in a course that had a nutritional component
3. Participants had previously sought nutrition information at least once

It was assumed that participants selected according to these criteria would be able to talk in-depth about online nutrition information-seeking.

The six interview participants were randomly selected from those who met all three qualifying characteristics (age, nutritional background, and previous use of the Internet to seek nutrition information). Two interview participants were recruited from each classroom. All of the interviews took place in an office-type room, which offered privacy and was located in the participant's school. Setting has been said to be important for conducting an effective interview (Rich, 1968); therefore, a familiar setting such as this one helped participants feel comfortable and encouraged conversation.

A semi-structured guide of questions and probes was followed throughout the interview (reference Appendix A). The semi-structured guide allowed participants to elaborate on questions when needed (Berg, 2004).

Items on the interview schedule were constructed in order to achieve the proposed research goals. The framework for these goals was formed by Kuhlthau's (1993) model and the interview questions were meant to get participants discussing tasks that may occur during each stage. Questions 1-3 did not correspond with any of the proposed research questions, but functioned as ice-breaker questions to get participants thinking about nutrition, ways they might find nutrition information, and the Internet. Question 12 existed to allow participants to add any comments to the interview that may not have fit within the interview schedule.

The interview began with informal introductory comments, which also included brief instructions and requested permission from the participant to audio tape the interview. Introductory comments were developed according to suggestions by Lindolf and Taylor (2002), who advised setting a conversational tone in order to make participants more comfortable to share their thoughts. The structured set of questions and probes was then used to initiate discussion. Closing comments thanking the adolescent for participating ended the interview. The interviews lasted roughly 35-45 minutes. Previous research has suggested that 45 minutes is the maximum time limit for an effective on-on-one interview, especially for younger participants, as long interviews can cause fatigue (Wimmer & Dominick, 2006). The interviews were transcribed for analysis.

Questionnaire

The primary function of the questionnaire was to gather demographic information and assess eNutrition literacy. The demographic information was used to provide context to the process of information-seeking. Measures of eNutrition literacy were used to explore relationships to the process of information-seeking and suggest future guidelines for the creation of online nutrition resources.

Seventy-nine questionnaire participants were recruited from a population of adolescents that represented the transition between early and middle adolescence (the ages of 12 through 16) from the Poudre School District located in Fort Collins, Colorado. This is a time for young people when information needs are changing: individuals may start to become aware of their needs for information and start to approach information-seeking in a more sophisticated way (Kuhlthau, 1988). Furthermore, it has been suggested that by the age of 12 children are at an evaluative level of consumerism. Valkenburg and Cantor (2001) proposed that by this age children are able to have wants and preferences, fulfill those wants and preferences, make choices and purchases, and evaluate products and their alternatives (p. 69). Thus, questionnaire participants should have spent a couple of years at a cognitive level where they have thought somewhat critically about and made choices about what they chose to eat and drink.

Furthermore, in Poudre School District, students receive formal nutrition education in both grade seven and grade nine. In the seventh grade, students participate in a Family and Consumer course, which introduces the food pyramid and food groups, as well as a health class that more formally introduces nutrition as it relates to body systems. In ninth grade, students can choose to take a Creative Foods course and/or a

Teen Challenges and Choices course, both of which have nutrition components. This project gained access to three classrooms: two at Preston Junior High School and one at Webber Junior High School. These classrooms were chosen because they contained cohorts of students who recently participated in one of these nutrition education courses.

Since participants were under the age of 18, but the research did not require discussion of sensitive information, the Colorado State University Internal Review Board for human subjects research determined that signed consent from parents was not required for participation. Instead, parents were notified of the project with forms sent home in the participating classrooms that gave parents the option to remove their child from any aspect of the study (reference Appendix B). No parent declined to have a child participate in the study. Participant consent was achieved by the participant completing the questionnaire and signing his or her name on the cover sheet (reference Appendix C). All members of the classrooms were invited to participate in the questionnaire and no students declined. The questionnaire took about 15 minutes to complete.

The questionnaire was administered in the classroom because it was a familiar atmosphere where participants were likely to view the research in a way similar to how they would view any other exercise, assignment, or test that occurs in the classroom. The questionnaire sessions began with a welcome and an overview of the instructions for completing the questionnaire.

The questionnaire first presented seven questions regarding nutrition information. These questions checked that participants had sought nutrition information at least once. They also provided a general idea of the different ways nutrition might fit into adolescents' lives. These ways included having looked up health information, linking

nutrition to the body, linking nutrition to mood, attention to what is eaten and drank, body image, and sports. These items were developed based on previous literature (Nuemark-Sztainer, Story, Perry, & Casey, 1999).

This project aimed to separate seeking information about exercise, eating disorders, and body image from seeking information about diet. Although exercise, eating disorders, and body image are related to diet, this research aimed to investigate specifically how adolescents sought nutrition information about what they ate and drank more generally. Since it is unknown whether participants naturally assumed the word 'nutrition' pertains to what they eat and drink, any questions relating to nutrition information explained that nutrition meant what a person eats and drinks. For example, item seven on the questionnaire was worded as follows: "Have you ever look on the Web at information about foods or beverages?"

The questionnaire included ten five-point Likert questions (questionnaire items 8-17) which assessed participants' levels of eNutrition literacy. A special type of literacy, eHealth literacy is necessary for utilizing online nutrition resources. Norman and Skinner's (2006a) lily model of eHealth literacy requires basic levels of six core literacies (traditional, information, media, health, computer, and scientific) to be eHealth literate. The eHealth (eHEALS) scale was created to measure all of these six literacies in a health context. For this research the scale was adapted to be specific to the context of nutrition rather than health more generally.

The scale used eight questions (questionnaire items 10-17) to measure knowledge, comfort, and perceived skills when using the Internet for health information. The scale also included two supplemental questions (questionnaire items eight and nine) that were

not part of the eHealth literacy score, but were suggested supplements to assess participant interest in obtaining health information online (Norman & Skinner, 2006b). Item analysis of the eight core items of the scale was performed, which yielded a coefficient alpha of .88, and component analysis explained 56 percent of the variance, both of which are significant measures. Test-retest reliability was assessed by Pearson's correlation and produced the range r=.49 to .68 for the eight items. An intra-class correlation of .49 was modest (Norman & Skinner, 2006b, p. e27).

The present research treated nutrition as an applied context of health; and thus treated eNutrition literacy as an applied context of eHealth literacy. To modify the existing eHealth literacy scale, the word 'nutrition' replaced the word 'health.' Items were also slightly reworded, while keeping the same core idea, to make them easier for adolescent participants to grasp.

Participants used a Likert scale to answer each item and were awarded a score for each item depending on their answer (i.e., strongly disagree= 1, disagree= 2, undecided=3, agree=4, and strongly agree=5). This assessment of literacy skills reflects literacy as a "spectral phenomenon," meaning that an individual has a score somewhere along a range between 8 and 40 (C. D. Norman, personal communication, October 25, 2007). The more positive the score, the higher the level of eHealth literacy.

Although research methods literature indicates that suggestive questions should be avoided (Wimmer & Dominick, 2006), all of the eNutrition scale items were phrased positively. When developing the original eHealth literacy scale, it was found that people were more likely to misinterpret or misunderstand the scale items if they were phrased negatively (C. D. Norman, personal communication, October 25, 2007). Therefore, since

the scale had been tested this way and was shown to be reliable, the modified scale remained entirely positively phrased when used in the present research.

Finally, participants were asked for the following demographic information: age, sex, race, whether or not they have ever taken a health class before, and what age they were when they took this health class. The race classification item was developed according to classifications used by the U.S. Census Bureau (2005). All of the demographic items were placed at end of questionnaire to allow a rapport to be developed before these more sensitive items were asked (Wimmer & Dominick, 2006). At the conclusion of the questionnaire, closing comments thanking the participant for participating in the research were given by the researcher to the participants.

Participants

Interview Participants

The six interview participants in this study were selected from three classrooms in two different middle schools in Fort Collins, Colorado. One of the classrooms was mixed 7^{th} and 8^{th} grade, one was 8^{th} grade, and one was 9^{th} grade. All of the participants had used the Internet before and had taken a health class when they were in 7^{th} grade (at either 12 or 13 years old). To give context to the analysis and discussion of the interviews, descriptions of each of the participants are provided. Pseudonyms have been assigned to each participant to preserve anonymity.

Kelsey, a white female, was 13 years old and in 7^{th} grade at the time of her interview. She was the youngest participant and acted a bit nervous throughout the discussion. She had taken a health class when she was 12 years old, but noted that she had used the Internet only once or twice to look up nutrition information. Kelsey was

confident that she had the skills to navigate the Internet in general, mentioning that she used it every day for about 30 minutes to an hour, usually for activities such as chatting and "Myspacing," using the social networking Web site MySpace.com.

At the time of his interview, Eddie, a white male, was 15 and in 8th grade. He spent what he classified as "a lot" of time online, roughly one to two hours a day completing various tasks such as "Myspacing" and homework, but he did not use the Internet for nutrition information unless he was required to for a school project. Eddie played soccer and mentioned that it was very important for him to eat well so he could play his best. He took a health class when he was 13 years old.

Will was 15 years old and in 8th grade at the time of his interview. He was a male of mixed descent, both white and Hispanic. Will was once overweight and noted using the Internet a lot to find nutrition information. Specifically, he spent time in the interview discussing a Web site he used through his gym and personal trainer. Will took a health class when he was 13 years old. He spent a moderate amount of time online each day, between 15 and 30 minutes.

Catie, a white female, was 15 years old and in 9th grade at the time of her interview. She held a cool confidence throughout our discussion and mentioned she had taken a health class when she was 12 and 13 years old (her birthday fell during the course). Catie had used the Internet only a few times to look up health information, and it was mostly for school. However, she went on the Internet about five to six nights a week for about 30 minutes to an hour to do things like social networking and chatting.

At the time of her interview, Kimmi was 14 and in 9th grade. She was a white female and had taken a health class when she was 12 years old. Kimmi was a member of

her school's dance team and spent most weekday afternoons practicing with her squad. She said that once or twice she had used the Internet to find nutrition information and that she spent about 30 minutes to an hour three or four nights a week doing things online.

Seth was a white male who was 14 years old and in 8th grade at the time of his interview. He mentioned taking a health class when he was 13 years old. He spent about 15 to 30 minutes a day social networking and chatting online. He said in his questionnaire that he had never used the Internet to find nutrition information, but during his interview he questioned that maybe he had used it once for a school project on nutrition.

Questionnaire Respondents

The 79 questionnaire respondents ranged in age from 12 to 16 and had an average age of 13.7 (Table 1). Thirty-one of the respondents were in 8th grade at the time of the questionnaire, 25 were in 7th grade, and 22 were in 9th grade. There was roughly an equal distribution of male (37) and female (42) respondents, who were primarily white (64). Sixty-six of the participants said they had taken a health class before, at an average age of 12.2.

Table 1

Demographics of questionnaire respondents.

Age	Average: 13.72 , Median: 14, Range: 12-16
Grade in School	7th grade: 25 (32%) 8th grade: 31 (40%) 9th grade: 22 (28%)
Gender	Male: 37 (47%), Female 42(53%)
Race	White: 64 (82%) African-American: 3 (4%) Hispanic: 10 (13%) Asian-Pacific Islander: 3 (4%) Native American: 5 (5%) Other: 5 (5%)
Taken a health class before	Yes: 66 (84%) No: 10 (13%)
Age during health class	Average: 12.2, Median: 12.25, Range: 10-14
Diagnosed medical condition	Yes: 3 (4%) No: 71 (90%) I don't know: 5 (6%)

Process of Analysis

The overarching goal of this study was to explore how adolescents find and make sense of nutrition information. To accomplish this, three types of data were integrated: 1) interview data; 2) eNutrition literacy scores; and 3) demographic information. Table 2 illustrates how each type of data functions in the discussion and analysis of this project.

Table 2

Function of data types.

Data	Function
Interview	to flesh out the process of nutrition information-seeking, giving special attention to the function of online resources
eNutrition literacy scores	to provide a baseline for the practical application of interview data
Demographic information	to provide context for Interview data and eNutrition literacy scores.

For purposes of analysis and discussion, data from the questionnaire is referred to as being from the "questionnaire respondents." Since the interview data is the foundation of this analysis, it is referenced as being from the "interview participants" or simply just the "participants." (The participants are also referred to as "these adolescents" for syntactic variety).

Interview data was analyzed using a constant comparative technique. The goal of this method was to look for common themes within the discussions as they related to the research objectives and the information-seeking process and examine them throughout the interview transcripts. Thus the interview statements were grouped into categories, conceptualized line by line, and compared to one another. This approach to interview analysis resulted in a discussion of the relationship between adolescents' feelings, actions, and experiences to components in the eNutrition literacy model and stages in the information-seeking process.

Questionnaire data, including eNutrition literacy scores and related opinions about nutrition and the Internet and demographic data were compiled, and the results were used

to give a broader context to the discussions of the interview participants as their discussion data related to their eNutrition literacy skills and their information-seeking process. Ultimately this analysis process resulted in an integrated discussion about the plausible theoretical interrelationships among eNutrition literacy components and information-seeking stages (Glaser, 1965).

Chapter IV – eNutrition Literacy

Two key findings emerged from the analysis of the interview and questionnaire data used in this study: 1) these adolescents primarily had formal nutrition information-seeking needs and 2) these adolescents used the Internet to fulfill primarily personal needs. These trends have implications within the framework of the eNutrition literacy model as well as the process of information-seeking. The following analysis and discussion chapters address these trends in relation to both eNutrition literacy and the process of information-seeking. A final analysis and discussion chapter will specifically address how these trends emerged from the participants' interview statements.

There are several important factors to point out about these two trends before beginning this discussion, however. First, the terms "formal" and "personal" are used to describe the types of nutrition information needs these adolescents were presented with. *Formal needs* are those presented to the participants by others, most often teachers assigning homework or projects. These *formal needs* are thus related to motivations external to participants' own interests or questions, and are generally presented and fulfilled in formal settings such as school. In contrast, *personal needs* were those that arose from a participant's own interests, ideas, and questions. In other words, *personal needs* were situations where a very specific correct answer may not have been necessary to achieve, such as when a participant wanted to learn more about energy drinks. *Formal needs*, such as completing homework or projects assigned by a teacher, generally were seen by participants to have a specific, correct answer.

The second key factor in the following analysis is adolescents' construction of the Internet primarily as a place where they participated in personal and social activities, such as social networking, chatting, and gaming more often than they participated in more traditional information-seeking. Thus, in the participants' experience, the Internet was more likely to be able to provide information to fulfill personal needs or to be used to engage in social activities. The final discussion and analysis chapter will discuss the foundation of these elements in depth; however for clarity of the analysis and discussion that precedes that chapter, it is necessary to understand the manner in which these terms are used.

Trends in eNutrition Literacy

Based on their discussions, it was clear that these adolescents were facing roadblocks because of their literacy skills, namely their nutrition-specific information and health literacies. The fact that these adolescents were often formally presented with nutrition information-seeking tasks by their teachers contributed to their inexperience using the Internet to find nutrition information, since they were usually using other sources such as textbooks to complete their homework or projects. Formal presentation of nutrition information-seeking tasks also contributed to the participants' feelings that nutrition information-seeking behavior was not part of their everyday habits. This pattern influenced their willingness to apply their health literacy skills in their food decisions. Ultimately, because of these literacy roadblocks, these adolescents were not fully engaging in the information-seeking process or receiving the entire benefit of online nutrition resources. This chapter examines the relationships of each of component of eNutrition literacy with special attention to the trends noted above.

The average eNutrition literacy score among the broader group of questionnaire respondents was 28.14, and the scores of the interview participants ranged from 19-32 with an average score of 26.8. With the highest score possibility a 40 and the lowest an eight, it was clear that most of the questionnaire respondents as well as the interview participants had room for growth in being able to fully engage the Internet as a resource for nutrition information. The individual eNutrition literacy measurement items gave insight into areas of the model that these adolescents may have been struggling with, and these points are presented in further detail as they relate to the following discussion of how the participants' felt about their abilities in the various stages of the eNutrition literacy model.

Ideally, when searching for nutrition information online, these adolescents should have been able to read the information that was presented (traditional literacy), know what nutrition resources were on the Internet and been able to develop search strategies to find the information they desired (information literacy), consider how the media may have been influencing the information they were being exposed to (media literacy), have the skills to make the correct health decisions (health literacy), have the ability to use a computer in the ways needed to find the information they desired (computer literacy), and know the limitations and benefits of the scientific information they found (scientific literacy) (Norman & Skinner, 2006a). A burden of these multiple literacy requirements is that there are multiple arenas in which a user can be deficient, and overall there are multiple opportunities for a user to be less successful in completing an online information-seeking task. Thus, it is helpful to approach each of the components of the eNutrition literacy model individually and discuss how the participants felt about their

abilities. The section concludes with a more general discussion of the overall state of eNutrition literacy among these participants and implications for the information-seeking process.

Traditional Literacy

As a foundation to searching for nutrition information online, these adolescents needed to be able to read the information that they encountered. Overall, they demonstrated an ability to read online information and a level of traditional literacy sufficient to complete an online nutrition information-seeking task. Although they minimally encountered online nutrition information specifically, they did not attest to any difficulty reading it.

In general, the participants preferred to not read a lot of information online because, as Seth expressed, "it gets boring because it's a lot of information to take in at once." Previous research agrees with this and suggests that adolescents prefer health messages that are personalized or tailored because they do not have to sift through irrelevant information (Gray et al., 2005a; Goold et al., 2003). Seth added that he preferred to "…skim the text and then look for keywords and stuff like that…like the heading and stuff, which I usually read…". Text-heavy online sources take a long time to sift through, and as a whole the participants favored "brevity."

Eddie reflected upon why he became bored when reading a lot of text online, stating, "I'm not a great reader myself." Throughout his interview Eddie discussed his experiences reading information online, which suggested that he did have the ability to read online information, but lacked a confidence in that ability. The eNutrition literacy model (and notions of literacy in general) emerges from social cognitive theory and ideas

of self-efficacy (Bandura, 1991, 1986), which suggests that the feelings of low confidence that Eddie expressed could be related to his capacity to use the Internet to find nutrition information. However, it did not appear that his confidence level in reading inhibited him from being able to read and understand information he was encountering online, given his discussions about his previous experiences doing just that.

Overall, these adolescents were able to read the information, including the nutrition information that they found online. This suggests that traditional literacy was not a barrier to fully engaging in the online nutrition information-seeking process. This also suggests that the reading level of the online information did not exceed the abilities of these adolescent users. However, the organization of some of the information into lengthy blocks may have prevented these users from ever reading some of the online information they encountered. Thus, existing online information, including nutrition information, may not have been consumed because it was not presented in an organized, concise manner in sync with adolescents' online reading habits.

Information Literacy

Since these adolescents were most often presented with nutrition information-seeking tasks and books to use as sources by their teachers for school homework or projects, they were unlikely to engage the Internet as a nutrition information resource. Furthermore, since they primarily used the Internet for personal needs, rather than formal needs like those presented by their teachers, they were even less likely to consider the Internet as a good place to complete that type of task. Ultimately, the manner in which these participants used the Internet on a daily basis conflicted with the ways they had sought nutrition information in the past, which minimized the cases that the Internet was

used as a nutrition information resource, subsequently hindering the development of strong search strategies and skills to find nutrition information online.

Data from the questionnaire indicates that the respondents had some difficulty finding nutrition information online, as 58 of the 79 respondents said they knew *how* to find helpful nutrition information online, but only 31 said they knew *where*; and only 32 respondents said they knew *what* nutrition information was available online in general. Since the participants had not encountered a lot of nutrition information online, they had not developed strong mental models (i.e., ideas about how the Internet can be used to retrieve nutrition information) and subsequently they had not developed confidence in their strategies for searching for nutrition information online. Kuhlthau (1991) discusses how information-seekers will select approaches to information-seeking that they are confident will succeed in fulfilling their information needs. If these adolescents had encountered online nutrition information-seeking situations, they should have been developing and refining their mental models (Marchionini, 1995), and in this case those models that are specific to what nutrition information is online and where and how to find it. The development of these mental models is analogous to the development of the participants' search strategies for finding nutrition information online. Yet, without encountering these situations, strong search strategies were not developed and mental models were not created.

Kimmi described her lack of knowledge of and experience in finding nutrition information online: "I don't really know any specific [nutrition] sites because no one has told me about them." Eddie shared the same view and, although on an average day he spent a couple of hours on the Internet and had once used nutrition information from the

Web as part of a project on "healthy foods around the world," he did not feel as if he had a lot of experience looking at online nutrition information: "I haven't used [the Internet] all that much for like, healthy tips or anything…".

Even Will, who had a greater amount of experience finding and engaging in online nutrition information compared to the other participants (he often used a Web site that contained nutrition information in tandem with his personal training program), felt that he did not know where else besides that particular site to find nutrition information online: "I really haven't used the Internet for like nutrition and stuff"

On the personal training Web site, Will would search for information about a specific type of food using the site's built-in search engine. The resulting pages contained information about the nutritional composition and value of that food (e.g., calories, carbs, fats, and sugars). The Web site also let him keep track of the things he ate so he could get an overall picture of his diet and subsequently find out if what he ate helped him stay on track with his personal training goals. The search strategy for finding nutrition information using this site was learned with guidance from his personal trainer and Will felt confident searching and navigating the information because he was familiar with that type of search functionality from his experience using search engines to find other information on the Web.

It seemed that when Will sought information for his personal training goals he viewed it as a formal nutrition-information task, essentially assigned by the personal training program. In other words, Will may not have viewed finding nutrition information as fulfillment of his personal goals. Rather, keeping track of the nutrition information related to what he ate and drank was a type of "homework," which ultimately

related to his larger personal goal of losing weight. Therefore, his use of the personal training Web site for nutrition information was very similar to the use of a textbook for school homework or a project, in the sense that he was told to use the source by an authoritative, trusted source (his personal trainer). He did not venture outside of the personal training Web site to find the information he needed, which could explain why he said he did not know where on the Internet to find nutrition information.

It is consistent with existing data that that these adolescents did have experience using the Internet for nutrition information, but it is was only a small portion of their total time spent online (Borzekowski & Rickert, 2001a, 2001b, 2000; Rideout, 2001, Skinner et al., 2003). It has been suggested that adolescents would view nutrition information as an increasing online need (Rolinson, 1998). Yet for these participants that did not appear to be true. Their nutrition information needs were minimal with regards to any source, not just the Internet.

They did have experience looking for more general information online, however, and the participants were able to relate those search strategies to the task of finding nutrition information online. When they were asked to imagine where they would go if they had to find a specific type of nutrition information online, each of the participants said a search engine was the first place they would go. For Kimmi, a search engine was the single dominant place to go online for any kind of information: "…Google is the only place I go for everything." A search engine had the benefit of ease and accessibility of use, which was why it was usually the first place Catie would go when she searched online: "I would probably Google it, because, like, Google is the easiest for anything because it's like right there [in the toolbar]" Previous research supports this finding, as

Hansen et al. (2003) found that adolescents turned to a search engine nearly every time when they would search for health information online. Other studies found similar findings about the popularity of search engines for health information (Grey et al, 2005b; Skinner et al., 2003) as well as information in general (Guinee, Eagleton & Hall, 2003).

Accessibility was a dominant desirable quality for these participants in using a search engine, which could be related to their preference for text-light online resources. Much like their preference for online sources they did not have to spend a lot of time reading, these participants liked methods of searching that were quick and to the point.

Consistent with previous research (Guinee et al., 2003), when using a search engine, the participants said they usually used search terms and phrases that represented exactly the type of information they would need to find. For instance, Kelsey remembered a time when she was searching for information about the "new food pyramid":

> "…I was looking up something about the new food pyramid. Like I wanted to see a picture of the new food pyramid and so I went to Google Images. … Then I'd probably go online to someplace like Ask or Google and type in "new food pyramid."

The participants also said that they would expect Web sites with URLs that represented exactly the type of information they were looking to have the information they needed. Will remembered a project he did about "the late decades" where he first visited the Web site decades.com because he figured it would contain the information he needed. This finding also correlates with existing literature (Guinee et al., 2003) that suggests adolescents will attempt to find information by "substituting their research topic into the dot-com formula www.*mytopic*.com" (p. 367). This suggests that adolescents may be more likely to seek information from Web sites that follow this formula and

perhaps be more confident that URLs that contain keywords related to their needs can provide the information they are looking for.

Gray et al. (2005b) found this "dot-com formula" was also true when adolescents searched for health information specifically. Several participants mentioned that they would visit either health.com or WebMD if they needed health-related information. A consequence of this "dot-com" formula, however, is the assumption adolescents may make about the relevance of the health or nutrition information found there. In other words, a Web site called nutrition.com may not actually provide relevant or accurate nutrition information, depending on the creators of the information and the purpose of the Web site. This means that if adolescents are likely to search in this manner, content creators should take particular care to ensure sites that fit into this formula are providing accurate information, and educators should emphasize skills to otherwise assess accuracy and relevance.

When asked how they decided which links to click on after a search engine returned their query, the participants said looked for keywords in the Web sites' titles and in the descriptions the search engine generated beneath the titles. Kelsey said that one of her courses in school had taught her these strategies to search and judge valuable information online:

> "I usually, like, read through and see what the title is and then if it has anything underneath it [in the search engine description] and see which ones seem to apply the most; and then I click on that one and then use the criteria I learned to see if it's a good [site] or not."

Existing literature has found that basic adolescent users tend to go down the list on the search engine page and click on links until they find a resource they deem useful (Gray et al., 2005b; Guinee et al., 2003). Both Gray et al. (2005b) and Guinee et al. (2003) also

found that more advanced users read the search-engine-generated descriptions before selecting a link to decide if the Web site could be relevant. Considering these previous findings, it is clear that some of the interview participants utilized search engines at a more advanced level than others.

Overall, an interesting relationship emerged between the experiences these adolescents' discussed and the information literacy skills they needed to successfully accomplish an online nutrition information-seeking task. Although the participants were confident in their search strategies for finding general information online, their minimal experiences employing those strategies to search for nutrition information specifically left them feeling insufficient in their knowledge of where on the Internet nutrition information could be found. Ultimately, confidence and self-efficacy are fundamental in being successful when using the Internet to obtain health information, including nutrition information (Norman & Skinner, 2006a).

Adolescents' lack of experience using the Internet as an online nutrition resource was driven by the fact that nutrition information needs rarely arose as personal needs. Instead, the participants were formally presented by their teachers with a goal to complete, such as homework, and a source to use, such as a textbook. The Internet, however, was a resource these adolescents used to fulfill their personal needs, primarily social networking, chatting, and gaming, and sometimes information-search that was not related to answering homework questions. Therefore, even when seeking nutrition information, they were unlikely to use the Internet as a resource because in their experience, it was not a place they had sought that type of information in the past.

As a result, these participants lacked knowledge about a variety of online nutrition resources as well as the ability to develop search strategies to find nutrition information online (which is, by definition, information literacy). This may seem unexpected since they had developed skills to search for other types of information online. However, these skills had not been translated to online nutrition information because the participants did not know where to find it. Fundamentally this suggests that nutrition-specific information literacy was a barrier to engaging fully in the online nutrition information-seeking process, since the skills necessary to do so did not have the opportunity to be developed.

Media Literacy

The participants were taught in school that media often have ulterior motives, such as selling a product or promoting opinion, when presenting information. According to the participants, nutrition information was a topic that had often been influenced by the media, exemplified by the prominence of food advertising and particularly the advertisement of "junk foods" towards children. Therefore, when seeking information online, they said they had knowledge of skills they could use to assess the credibility and accuracy of sources, including online nutrition sources. However this act of assessment seemed to foster an uncertainty about the validity of online sources overall. This was particularly true with regards to the validity of online nutrition sources, since the participants were used to receiving nutrition information from more formal sources that they trusted and did not have to gauge the accuracy of, including teachers, books, and parents. Fundamentally, this uncertainty had an important effect on the participant's ability to engage in the online nutrition information-seeking process: it discouraged them

from using the Internet, a source of information to fulfill personal needs, to fulfill their formally presented nutrition information needs.

The participants had been taught in school or from their parents to be critical of information provided by the media about food, particularly food advertisements on television. Eddie said he knew that television usually advertised junk food rather than healthy food, and he thought this might be because junk food advertisements were "more fun." Similarly, Catie thought that food advertisements were "just giving one opinion about food" because their ultimate goal was to sell a product, not to get people to make a healthy choice.

These adolescents demonstrated an awareness of the media's effects on nutrition information that previous literature may consider to be high (e.g., Brown & Witherspoon, 2002; Steele & Brown, 2005; Strasburger, 2004). The trend in this body of literature suggests young people are minimally critical of the information they receive from the media (some of which can be misguided or wrong). Brown and Witherspoon (2002) suggested that motion is necessary to build the body of research, regulations, communication campaigns, and health literacy to improve the way adolescents are affected by the media's portrayal of foods and nutrition. Some studies (Gray et al., 2005a, 2005b) have found that adolescents do, in fact, have the ability to appraise online health information at a sophisticated level. So, perhaps for these adolescents, their school and/or parents had taken some of these steps to increase their awareness of these media effects issues.

The participants also understood that the Internet was a place where anybody could contribute information. Although these adolescents recognized this as a good thing

because it gave people an outlet to talk about whatever topics they wanted, several of them also pointed out that not everyone online provided accurate information. The participants related their views of television advertising to online nutrition information and felt there was ample opportunity for online authors, even if they were not specifically advertising, to give only one opinion about a food and not present a comprehensive view of a food's nutritional benefits and drawbacks.

Ultimately, the participants said that they should consider the accuracy of online nutrition resources because the information they were receiving may have been affected by several factors: 1) the nutrition information providers may have been pushing a personal agenda or selling a product, even if they were not specifically advertising; 2) the provided nutrition information was opinion and not supported by fact; or 3) because personal agenda and opinion are so prevalent, in many nutrition information cases there were multiple sides to an issue and all sides may not have been provided.

The participants identified media sources as a forum where individuals and companies tried to push a personal agenda, especially in the realm of food advertising. Eddie said that some companies "…[don't] always tell everything about their product so you can't really trust them, because they wanna sell more and more to get their money." The adolescents thought that television was a place where unhealthy foods were given a positive spin or made to appear "cool" so they might become interested in the product. Eddie even talked about how he thought foods were unrealistically presented to him:

> "…TV advertises junk food a lot. Cheetos, whatever. Well, Red Bull and stuff like that….The most common one I usually see is Red Bull gives you wings and then someone drinks and flies away, like, it's cool to fly…cartoons also, I think like they would eat [food] in one bite and you would think 'Oh, that must be good'"

Catie said this phenomenon occurred because the people who make food products "…of course want you to eat their food because they, like, make money, so they are going to tell you that their food is good and the best even if it's not good for you."

As a whole, the participants thought that food advertising did not present wholly honest and comprehensive information about nutrition. Their opinions about the validity of information from food advertising were the same whether that advertising came from television or online. Several of the participants also noted that when online they would most often see food advertisements in side bar or banner ads rather than video-type advertisements like those seen on television.

The participants also thought the Internet was a place that was full of opinions that were not necessarily supported by fact, particularly on Web sites where users contributed to information or sites where everyday individuals generated the information. For instance, when visiting Wikipedia or blogs, the adolescents said they should consider the validity of the information since "you can type in anything there." Previous research found that adolescents are very suspicious about individuals sharing their opinions about health issues online (Gray et al., 2005a). Even when visiting sites that were seemingly created by someone qualified, the participants said that if they looked at the author's credentials the topic covered was sometimes not his or her specialization or field. Kelsey talked about her experience visiting a Web site where she thought a doctor was giving health advice only to "find out that it wasn't really written by a doctor." She then went on to discuss how "you can't always trust random people to just be telling the truth, it could just be [their] idea."

In light of this, these adolescents knew they *should* consider the creators of the information and look for supporting resources to assess if a source of information was valid. Kimmi talked about how she was taught to gauge if a source was valid:

> "Lots of times sites have sources and stuff that they cite at like the bottom of a page where they have links to other pages and stuff. If they have those, it's usually a more reliable source."

Seth shared similar knowledge:

> "Well, I look at those sources and if they don't have any sources and they don't cite any of their information or anything, then I usually find a different page and [it's] usually one that has that"

Although they felt they should judge a primary source by this criterion, the participants did not discuss any further criteria that they would use to consider the validity of the supporting resources a primary source cited or linked to. For these adolescents, simply having citations that supported the claims being made seemed to be a comfortable depth of analysis of the validity of a source.

The participants would consider a source accurate if other sources provided similar information. Seth talked about what he required in order to feel comfortable that the information from a Web site was correct:

> "Like if they have a bunch of nutrition facts that's the same as like eight different other websites [and] they have like the same nutrition value and stuff, like I'd usually look at that and go, 'Okay, that's probably pretty accurate.'"

As a whole, the participants felt most comfortable using information if multiple sources had the same information. This is consistent with existing literature, which states that adolescents tend to cross-check the accuracy of information across Web sites when searching for health information (Gray et al., 2005b).

It is unknown if these adolescents actually engaged this knowledge of investigating the creators, looking for supporting sources, and cross-checking information in the assessment of the validity of sources, since their conversations focused on the knowledge they had, rather than illustrating specific experiences where they had utilized the knowledge. It seemed that they knew these were habits they *should* have, and the fact that they were not using the Internet as a nutrition resource likely contributed to their lack of examples of having utilized these habits regarding online nutrition Web sites. This will be an important behavior to address, given that in order to make correct food choices it is necessary to be able to sift through irrelevant or inaccurate sources to acquire correct nutrition information.

These adolescents also said that because personal agenda and opinion were prevalent on the Internet, they sometimes found conflicting information among sources and sometimes did not feel confident when this situation occurred. Gray et al. (2005a) suggested that adolescents view its capability to present multiple sides of an issue, particularly in comparison to other sources such as people and books, as a benefit of using the Internet as an information source. Thus it is worthy to explore why it is that these adolescents sometimes felt wary when presented with multiple sides of a nutrition topic.

Overall, the participants said they should be given multiple opinions about what they should eat and the healthiness of foods because they should be able to make their own educated decisions. However, at the same time they also demonstrated that they did not feel as comfortable holding their own opinions about nutrition as valid as facts from a more trusted source of information were. For example, even though in school he had

been taught basic skills to be able to make a correct nutrition decision, Will said he sometimes "just wasn't sure" about the health value of the foods he ate, which was why he sought more information about them from his personal training website. On the Internet, the participants felt especially uncertain about how to decide what information, including nutrition information, was trustworthy, and said that they would turn to sources they knew they could trust, teachers, books, or parents, to confirm uncertain information they found online.

It seemed that these adolescents lacked enough self-efficacy in their own knowledge about nutrition to confidently discern what was right or wrong in light of the known variability of information online. Thus they needed support from trusted sources. These participants recognized that the Internet has the capacity to provide them multiple opinions that they can draw their own conclusions from, and they did say this was something they wanted. Yet they felt they would not simply assume truth from online nutrition information they were unsure about because they considered that personal agenda and opinion could be impacting the information. Essentially, they knew they should make educated decisions by double-checking their conclusions for accuracy with a trusted source. Yet, it is again unknown if they actually utilized this knowledge in assessing Web sites, including nutrition Web sites, since they did not explain specific instances where they had done so.

The participants had developed a strategy to sometimes deal with conflicting information on their own terms, by either siding with the majority or deciding upon a happy medium. Kimmi explained how she would try to take multiple opinions into account to reach her own decision about what she thought was right:

> "That's a tough question…I think that if there was enough sites to back up both sides I try to stay, like, in the middle…So, I would kind of take both parts and kind of make it into one, if that makes sense. So, it's going to be like 'Let's make a medium,' find the middle ground."

Kimmi then remembered how she encountered this problem when working on history projects in the past; and she first mentioned she might throw the idea or topic of conflict out before she mentioned she would try to find a happy medium:

> "There are a lot of history projects…and you research someone and they say they do different things that will, like, contrast each other. So then, I'm like, I don't know what to put in this [project] because I'm trying to find the facts. So then I normally toss it out if they contrast each other. Or, if they say like good and bad things about him, I'll kind of say he's like a medium person."

When ultimately deciding what that middle ground would be, Kimmi said that she would go with her "gut feeling" and that she might double check with her parents if she had questions.

Ultimately, these adolescents had a sufficient level of media literacy, evident by their awareness of the potential media influences on nutrition information. However, the uncertainty cultivated by the act of needing to assess credibility and accuracy reduced the confidence these adolescents had in the Internet as a nutrition information source. This lack of confidence coupled with the fact that these adolescents were primarily being presented with formal nutrition information needs, and resulted in them having minimal experience with online nutrition information. Although media literacy did not seem to be a barrier to participating in online nutrition information-seeking tasks, their lack of experience may have prevented them from utilizing, and truly cultivating their media literacy knowledge in order to receive the maximum benefits of using the Internet as a nutrition resource.

Health Literacy

These adolescents had a sense that nutrition, as well as health in general, *should* be something they cared about and they also knowledge about basic nutrition principles. However, they often did not employ their nutrition knowledge in their actual food decisions. This is an interesting occurrence, and suggests that although their level of health literacy was sufficient for them to know what a "correct" health decision was, other beliefs or factors in their lives influenced their willingness, but not their ability, to make those decisions. Fundamentally, this affected their use of the Internet for nutrition information. For these adolescents, the Internet was viewed as a resource that fulfilled more personal, less "official" needs, and since there were few instances where these adolescents sought information about what they were eating or drinking to fulfill their personal needs they did not utilize the Internet as a nutrition information resource as part of the nutrition information-seeking process.

Demonstrated by their interview statements, these adolescents had knowledge to know what a healthy food choice was and how healthy food choices benefit a person. However, when discussing the actual food choices that both they and their peers had made in the past, there was a disregard for the things they knew about nutrition. Among the participants, three trends emerged as to why this phenomenon occurred among "people their age" : 1) although some adolescents knew that nutrition should be important to them the participants thought most adolescents prioritized other factors with regards to food choices, such as taste, convenience, and their limited food options; 2) the participants thought that most adolescents felt that at this point in their life eating unhealthy would not have a significant impact on them; and 3) the participants thought

that most adolescents prioritized other parts of their life, such as social life and school, over being concerned with nutrition.

As a whole, the participants said that nutrition or healthy eating was a principle that was important overall and made a connection between paying attention to what you eat and benefits to overall health. Kimmi said that people should pay attention to what they eat because it affects the way they feel:

> "Well, I think that if you eat right that you can stay energized a lot. Especially if you eat breakfast in the morning, you can keep going. It's just good for your body…"

Several other participants mentioned that nutrition should be important to them because they played sports, such as Catie who had dance team practice every day: "Yeah, I have practice every day with my dance team, so I kinda have to pay attention to what I eat so I don't get tired or feel sick."

Eight-eight percent (69) of the 79 questionnaire respondents also said they agreed or strongly agreed that what you eat and drink affects your body a lot; and 80 percent (63) said they agreed or strongly agreed that what you eat and drink changes the way you feel a lot (Table 3). The majority of the participants also said it was either very important or extremely important that they eat well to look good (56 percent), play sports (66 percent), and/or feel good (71 percent). Ultimately, the interview participants spoke strongly about what they thought they *should* know about nutrition and how it affected a person, rather than clearly illustrate how they *actually* cared or did not care about nutrition and how it *actually* affected their bodies, the way they felt, or the sports they played. This could be because they did not spend time thinking about nutrition in this manner, since nutrition was not relevant to their everyday habits. Instead they *actually*

thought about nutrition primarily only in the instances when they were completing school homework or projects.

Table 3

The role of nutrition in adolescents' lives.

Adolescents' opinions about how what they eat and drink affects their body				
Strongly Disagree	*Disagree*	*Undecided*	*Agree*	*Strongly Agree*
2 (3%)	2 (3%)	6 (8%)	33 (42%)	36 (46%)

Adolescents' opinions about how what they eat and drink changes the way they feel				
Strongly Disagree	*Disagree*	*Undecided*	*Agree*	*Strongly Agree*
1 (1%)	7 (9%)	8 (10%)	48 (61%)	15 (19%)

Adolescents' opinions about the importance of eating well to look good, play sports, and feel good					
	Not at all important	*Somewhat important*	*Neutral*	*Very important*	*Extremely important*
Look good	3 (4%)	6 (8%)	26 (33%)	25 (32%)	19 (24%)
Play sports	1 (1%)	8 (10%)	10 (13%)	28 (25%)	32 (41%)
Feel good	3 (4%)	4 (5%)	16 (20%)	32 (41%)	24 (30%)

Frequency of adolescents thinking about nutrition				
Not at all	*A little*	*Somewhat*	*Quite a bit*	*Very much*
4 (5%)	11 (14%)	32 (41%)	25 (32%)	6 (8%)

Adolescents' opinions about the importance of knowing nutrition information				
Not at all important	*Somewhat important*	*Neutral*	*Very Important*	*Extremely important*
1 (1%)	9 (11%)	28 (35%)	25 (32%)	16 (20%)

It was clear from their discussions that the interview participants thought nutrition was a concept they should care about, however they also said they were likely more in-

tune with this recognition than many of their peers. Kimmi admitted that most of her peers probably didn't care to pay attention to the foods they ate:

> "…I think that they have, like, a good sense that an apple is better than, like, a swiss cake roll or something like a pastry kind of thing, or like a donut. So, I think they know the difference, but I think that people would just rather choose the donut over that."

These adolescents spent a great amount of time discussing how "people their age" did not feel nutrition was something they needed to care about, while at the same time speaking of themselves as outliers who did, or should care about nutrition. However, the stories they told revealed that when confronted with an actual food decision, they made the same kinds of nutrition decisions as the very masses they described themselves as being different from. That is, they were still likely to select the donut over the apple. This effect is similar to the "third person effect" prevalent in many media effects studies (e.g., Davison, 1983; Henriksen & Flora, 1999; Strasburger, 2004), where an individual believes the media effects other people, but not his or her self. In this case, these adolescents felt they were a third person to the larger group of adolescents who did not feel that nutrition was important.

For example, Catie first said that she thought nutrition was important and paid attention to what she ate because she was a part of the dance team and therefore needed to stay healthy. However, later in her interview when she talked about what she liked to eat, she described how she would often choose a donut for a snack rather than an apple, even though she knew the apple was a healthier choice. It could also be that these participants felt it was socially desirable to care about nutrition. In fact, they may have been influenced by this notion throughout their discussions. This occurrence has

important implications for this project and is deserving of special attention; therefore it is addressed in a special section of the conclusion chapter of this document.

In addition to what the participants said they thought they *should* know about how nutrition affects a person, they also said that they *did* know basic nutrition principles and received most of that information from their teachers and parents. The knowledge they received in school was related to the food pyramid and general concepts about what was healthy and unhealthy to eat. For example, Eddie learned in school that oils, like those that would be on a greasy pizza, were bad for you. Kelsey also discussed an example of something she had learned from the food pyramid: "Well, just seeing, like, the food pyramids I know, like, fruits and vegetables and stuff like that are healthy." The participants also learned this kind of information in their science, health, and/or creative foods class(es).

As the participants talked about their knowledge of nutrition information and the food decisions they had made in the past, most of them did not execute their knowledge in their food choices. Consistent with previous research (Neumark-Sztainer et al., 1999), the motivation for choosing foods was not because of nutritional value, but instead on choosing foods because they were convenient, they tasted good, or they were simply something the participants had always eaten. For instance, early on in his interview Seth said he thought nutrition and staying on top of his health were good and important things. Several minutes later, he went on to say how he would often eat Ramen noodles and microwave burritos for lunch because they were easy to prepare and because they tasted good. He even admitted that he knew this was not the best nutrition choice, but he valued taste over nutrition: "…I know it's not healthy, but it tastes really good!"

Kelsey stated that she and her friends were usually coming and going and did not have a lot of time to truly think about what they were eating, so they opted for convenience instead. She said this was probably a reason why people her age did not care about nutrition:

> "Yeah, I would say it's not really generally important to kids my age…because they're not really concerned with nutrition all that much. I think usually we're on the run or something like that, so [you eat] whatever you can find to grab to eat…"

Kelsey also told a story about how she chose what to eat for breakfast, and her selection was based on the foods that her parents made available (consequently, these foods became her favorite foods to eat for breakfast):

> "Well, my decision is mainly based on Cheerios, oatmeal, and like Frosted Mini Wheats or something, because those are my three favorite things to eat. So, like I always try and decide if I want a little bit of fruit taste, which I go with the oatmeal, or, like, if I want Honey Nut Cheerios or just plain Mini Wheats."

Kelsey made her decision based on taste, not by considering the nutritional value of her options. Previously in her interview, she discussed how she was mindful of what she ate: "… I'm not always really physically active, so I at least try and monitor what I eat so I can try and stay healthy." Yet in choosing what to eat for breakfast, Kelsey's parents did the bulk of the nutrition monitoring by providing only several of the more healthy breakfast options for her to choose from. This left little room for Kelsey to need to employ her nutrition knowledge in making a decision about what to eat. This type of situation likely contributed to thinking about nutrition not being an everyday habit for the participants, since, in fact, other people in their lives were doing a portion of that thinking for them.

The participants also thought it was hard for young people to make changes to the kinds of foods they had always ate, especially if they had not seen an adverse effect from eating those foods. For instance, when Catie admitted that she often chose to eat a donut for a snack rather than an apple, even though she knew the apple was healthier, she said she did this because: "…I like it and I've always eaten it and I've been fine." Catie felt that her history eating donuts for a snack had not had an undesirable effect on her, and therefore even though it was not the best nutrition choice, she could not see any long term consequences and she was confident that she could continue eating donuts with little penalty.

These adolescents also said that people their age were still growing and their bodies had physical properties that allowed them to be able to eat whatever they wanted. Kimmi said this was a reason why several of her friends did not utilize the nutrition knowledge they had: "Like, some of my close friends they don't really care because they have, like, fast metabolism so they don't have to."

As a whole, the participants thought that adolescents spent more time being concerned about school and sports rather than employing their nutrition knowledge to food choices. They thought it took a fair amount of time and effort to pay attention to the rest of their lives, which resulted in little time or desire to invest a lot of thought into what they were eating. Kimmi described this feeling of how the "rest of life" took a dominant role for adolescents compared to nutrition:

> "Yeah, I think that's partly it, because a lot of people have, like, sports and then school gets a lot more harder and [there's] a lot of pressure to do good…a lot of people are like that, and then, like, when we're not doing homework or sports I think most people are just relaxing or do whatever they have to, to just, like, take

> a breather and stuff. I just don't think they have enough time and, like, school takes up so much."

The broader group of questionnaire respondents did not say they spent very much time thinking about nutrition either (Table 3). Only six of the 79 respondents said they thought about nutrition "very much," while 32 said they thought about it "somewhat" and 25 said they thought about it "quite a bit." Furthermore, only 16 of the participants thought it was "very important" that they knew the nutrition information about what they ate and drank. The larger majority were either neutral (28) or thought it was "somewhat" important to know that information (25). These data support the idea that nutrition did not play a major role in these adolescents' everyday lives.

The fact that personal nutrition information needs did not often arise in the participants' everyday lives likely contributed to their behavior of not regularly employing the nutrition knowledge they actually possessed. Since nutrition information needs were usually presented to them formally, by teachers for homework or projects, the skills and knowledge they possessed in relation to nutrition were not extended outside of the formal realm of fulfilling these academic needs. Seth even said: "I think we're given [nutrition] information. I don't think a lot of people use the information. In one ear and out the other." This statement adequately sums up the role nutrition played in these participants' lives in general. Several trends in their lives contributed to this notion, including the fact that some nutrition choices were being made for them by other people, specifically parents, and that it was difficult for them to see any long-term ramifications of what they ate and drank at this point in their lives.

Thus, although these participants possessed the knowledge and skills to be able to make basic, correct nutrition decisions, it can be said that their health literacy specific to

nutrition was not fully developed, because they often did not utilize this knowledge or these skills when making actual food choices. This phenomenon affected their ability to participate in online nutrition information-seeking, since the Internet was primarily a source used to fulfill personal needs and thinking about or actually making correct food choices was not an everyday activity for these adolescents; therefore these personal needs were not even occurring in their lives.

Computer Literacy

Throughout their interviews, these adolescents expressed a confidence and high experience level when using computers and the Internet. Their computer literacy was one of the strongest components of their overall eNutrition literacy, and therefore their ability to use the technology to complete an online nutrition information-seeking task did not appear to be hindering them in any way. Rather, their computer skills seemed to be giving them confidence that although they had not had much experience finding nutrition information online, given the opportunity they would be able to succeed in using the Internet, especially online search functions, to find the nutrition information they needed.

The fact that they had minimal experience engaging the Internet to find nutrition information was based on their view of the Internet as a source of more informal, personal information. In their experience, the Internet was primarily used for personal, social tasks, specifically for social networking activities, chatting, and gaming. This was in contrast to how they had experienced searching for nutrition information in a formally presented setting for school homework or projects. Therefore, although they were unlikely to use online sources for nutrition information, it was not their ability to use the

technology that was hindering them, but rather their ideas about what the Internet had to offer as a nutrition information source.

These adolescents engaged in social networking, emailing, gaming, and used search engines to find information, and they enjoyed the time they spent online. Seth even described the Internet as something that was used for "pretty much everything." Catie agreed and said: "Well, I use the Internet for, like, everything. Like talking to my friends and homework and stuff. I go online pretty much whenever I need something." Data from the broader group of questionnaire respondents indicated that nearly all of the adolescents had gone online in the past (76 respondents said they had) (Table 4). Forty-two percent (33) of the respondents said they went online every day and ninety-three percent (73) went online at least once or twice a week. Eight-eight percent (69) of these adolescents spent at least 15-30 minutes online at a time. Ninety-five percent (74) had a computer that they used to go online in their own home, and ninety percent shared a computer with others in their home (parents, siblings, and/or other family members).

Table 4

Adolescents' computer and Internet use.

Adolescents who have used the Internet: *Yes*: 76 (96%) *No*: 3 (4%)				
How often do adolescents go online?				
Not even once every week	*1 or 2 times a week*	*Between 3 and 4 times a week*	*Between 5 and 6 times a week*	*Every day*
5 (6%)	9 (11%)	19 (24%)	12 (16%)	33 (42%)
How much time per day do adolescents spend online?				
<15 minutes	*15-30 minutes*	*30 minutes-1 hour*	*1-2 hours*	*>2 hours*
10 (13%)	25 (32%)	20 (25%)	18 (23%)	6 (8%)

A favorite online activity was social networking, and each of the participants said they had spent time on either MySpace or Facebook. Catie explained how social networking let her easily stay connected with her friends while they were not at school without having to inconvenience anyone else in her family:

> "Like I can talk to my friends from, like, anywhere; and it's better than being on the phone because then I can, like, talk when my sister is busy on school things or, like, they [her family] are watching a movie."

Similar to several of the other participants, Catie also said social networking was something she had experience doing online almost every day, in addition to instant messaging and checking her email.

In addition to social networking, both Eddie and Kelsey talked about playing games online. Eddie said he played World of Warcraft as well as other "adventure games" on the Internet. Kelsey played a dress-up game called MyStory where she enjoyed creating an outfit for her avatar based on a descriptive word given to her by the

game each day. She liked this game because it let her write a diary entry every day and try out new and different fashion looks on her character.

Social activities such as social networking, chatting, and gaming, were the primary activities these adolescents engaged in while online. In their experience, they used the Internet more for these types of tasks than they did for seeking information. As a whole, the participants were able to tell specific stories about being social online, were energetic about participating in that kind of activity, and took time to really explain why they enjoyed doing those things. The fact that they engaged in these social activities more often, and seemed to be excited about them, contributed to their view of what the Internet has to offer as a source of information. Their most dominant and positive experiences online were centered on social activities and less on the Internet providing them any type of information, especially information that was accurate and could fulfill a formal information need. The fact that their nutrition information needs were most often formally presented to them by teachers for homework or projects, where they were provided textbooks to use to find information, further contributed to their behavior of not using the Internet for nutrition information, and as a consequence their experiences online were more social than information-seeking.

The participants did have experience doing other things online. For instance, all of the participants had experience using a search engine to search for information online; however, they had minimal experience using a search engine to find nutrition information. As part of their eNutrition literacy measure, 49 of the 79 questionnaire respondents said they either agreed or strongly agreed that they knew how to use the Internet to answer their nutrition questions. So, it is notable that the interview participants

had not experienced using a search engine, a primary search strategy, to find nutrition information. This is likely related to the fact that they simply were not using the Internet in general to fulfill their nutrition information needs.

When asked to imagine what they would do if they had to use the Internet to find nutrition information, the participants were confident that the computer and Internet skills they already possessed to find general information online would be used to find nutrition information. It was apparent from their discussions that the participants thought the Internet contained a lot of valuable and invaluable information; and they also felt comfortable using online tools such as search engines to find that information. For example, Kimmi said she had no trouble navigating her way around the Internet: "Well, I'm pretty comfortable with it, like I can get on sites and I can, like, navigate places."

The participants generally used a search engine to search for nutrition information only if it was for school homework or projects. Since he was part of a personal training program and kept track of things he ate, Will often used an online search engine to find the nutritional value of his foods. However, the participants rarely mentioned using a search engine to seek out nutrition information online for their own edification independent of school (Kelsey once looked up nutrition information about a chocolate covered granola bar). Again, this could be a consequence of these adolescents simply not thinking about nutrition and utilizing their nutrition knowledge in their everyday food choices, therefore they did not reach the point of searching for nutrition information online and subsequently using a search engine to help them.

The larger group of questionnaire respondents also had minimal experience looking for health or nutrition information online (Table 5). Thirty-seven of the 79

respondents said they rarely and 28 said they never looked at the Internet for health information. With regards to nutrition information specifically, 26 of the respondents said they had never looked it up online and 22 said they had only done it once or twice. Only one respondent said they had used the Internet to look up information about foods or beverages a lot.

Table 5

Adolescents' use of the Internet for health and nutrition information.

Adolescents' frequency of looking up health information online				
Never	*Rarely*	*Occasionally*	*Frequently*	*Always*
28 (35%)	37 (46%)	11 (14%)	3 (4%)	0 (0%)
Adolescents' frequency of looking up nutrition information online				
Never	*Once or twice*	*A few times*	*A lot*	*Don't know*
26 (33%)	22 (42%)	18 (23%)	1 (1%)	1 (1%)
Adolescents' opinions of the usefulness of the Internet in nutrition decisions				
Not at all useful	*Not useful*	*Useful*	*Very useful*	
9 (11%)	33 (42%)	33 (42%)	4 (5%)	
Adolescents' opinions of the importance of being able to find nutrition information online				
Not important at all	*Not important*	*Important*	*Very important*	
5 (6%)	36 (46%)	33 (42%)	5 (6%)	

Despite not having a lot of experience looking for health and nutrition information online, 50 of the respondents still said they had the skills to know whether the nutrition information they did find was useful. Yet, 40 of the respondents thought the Internet was either not at all useful or not useful in providing information to employ in making

decisions about what they ate and drank, versus 37 who said the Internet was either useful or very useful for this purpose.

The respondents were also divided in their opinions of whether or not they thought it was important that they be able to find nutrition information online, with 38 of the 79 participants saying it was either important or very important that they be able to and 41 saying it was either not important or not important at all. This data supports the idea that the participants had a conflict occurring between their views of nutrition as a topic and the Internet as a resource. If their perception was that the Internet was too informal of a resource to fulfill their more formal nutrition information needs, it makes sense that some of the respondents would not think it was important that they be able to find nutrition information online, since they were not used to using the resource for that purpose. Instead, they would be more likely to expect the Internet to be able to provide them with other things, such as social networking and chatting opportunities, since they were regularly engaging in these activities.

When engaging in online activities in general, the participants usually enjoyed their experience. The Internet was described as "fun" in reference to gaming and social networking, which were ways the participants relaxed or goofed around online. It was also described as "easy," which was a term used in reference to utilizing a search engine to find information online. When searching online, the participants liked that information was right at their fingertips. Catie talked about the accessibility of information through search engines: "It's, like, easy. You just type in what you want and its right there!" Kelsey said that one of the great things about online information was that it was "constantly being updated to whatever's new out."

It was clear that these adolescents possessed the skills necessary to accomplish online tasks using a computer and the Internet. Primarily, they were used to using the Internet to engage in social activities such as social networking, chatting, and gaming. Therefore, with regards to their formally presented nutrition information needs, they did not view the Internet as a source that would fulfill those needs, which was also partially due to the fact that they were used to using books assigned by their teachers to find that information. However, their technical skills were present; it was their experience finding nutrition information online that lacked.

Scientific Literacy

These participants were not in positions to assess the full scientific limitations and benefits of the nutrition information they received because they did not possess a deep understanding of the topic. They had a basic level of scientific literacy and knowledge of basic nutrition principles, and although they were able to assess some of the benefits and drawbacks of where their information was coming from, they did not assess the scientific value of the information itself. These adolescents knew enough about nutrition to make informed health decisions, but not enough to deeply engage with or contribute to the larger community of nutrition information. Due to their lack of experience with online nutrition information, they did not engage with the online body of nutrition information either. As discussed previously, their lack of experience engaging with online nutrition information was due to the fact that they were usually formally presented with nutrition information-seeking tasks, as well as related nutrition information sources, by their teachers for school homework or projects.

These adolescents had basic definitions of what nutrition was, and in their discussions each of them associated the term with food and made a connection between nutrition and a person's health. Eddie and Seth both had expanded definitions of nutrition and talked about how the elements that made up food were the actual nutrition. Eddie said:

> "In general, I would say how much like health, how much carbohydrates and sugar and vitamins C [and] D. How much you take in nutrition-wise. In one word I would probably say 'health-wise'"

The participants formulated their definitions of nutrition based on information they received from their teachers and parents about what was healthy and unhealthy, as well as through nutrition labels on foods, which was, as the participants explained, a way the things they learned from their parents and teachers were put to use. For instance, Catie could look at nutrition labels to find out if a food was healthy or not:

> "Like, it can tell you how many calories or fat or whatever is in the food, and then you can pick something based on what you're looking for. Like, low fat or lots of protein or whatever."

For these adolescents, healthful foods like fruits and vegetables were defined as being nutritional. On the other hand, junk foods such as Doritos or Redbull were not referred to as being part of a person's nutrition. Essentially, these participants did not semantically refer to nutrition as a broader concept where both healthy and unhealthy foods played a role. Rather, the idea of nutrition was centered around healthful foods and food choices.

The participants also said they knew that nutrition *should* have an important role in a person's life and that eating healthy *could* have long term impacts. For instance, Will said that "…Your whole life [if] you are eating bad, it's going to, like, catch up to

you and stuff." Eddie thought he should be paying attention to eating healthy because "I just want to have a healthy life and live for a long time."

Even though they held these basic definitions of the term, the participants did not utilize this knowledge in their actual food choices. Therefore they did not spend time engaging with information to make decisions about what they ate and drank. Overall, at this point in their lives, the involvement these adolescents had with nutrition information was not extensive enough where they had the opportunity or desire to engage in analytical conversation about nutrition. This is likely related to the fact that nutrition information needs rarely arose out of their everyday lives, but rather arose from formal nutrition information-seeking situations such as homework or class projects. This contributed to their minimal experience engaging with the topic at an analytical level, since the way they needed to be involved with the nutrition information was already defined for them by the objectives of the homework or project. In other words, their goal was rarely to draw conclusions of their own from nutrition information, but rather to answer questions that had a specific answer embedded in the source of information they were guided to use.

It is likely that this behavior was affecting the participants' abilities to get the maximum benefits out of the online information-seeking process, given that being able to go back and reformulate, refine, and expand upon ideas is one of the most beneficial characteristics of information-seeking models. Only experiencing nutrition information while seeking a specific answer meant these adolescents were limited to engaging with the nutrition information they encountered from any source only on the surface rather

than thinking about deeper meanings for, values of, importance of, or relationships among the information.

The participants did say they knew they should engage in basic assessment of nutrition information they found online if it conflicted with information elsewhere online. They had tactics to determine the accuracy of information, such as checking multiple sources for consistency and looking at the creators of the information. They were also mindful of the media's potential influence on the online nutrition information, as well as nutrition information in general. Yet it is unknown if they were actually instituting these skills when searching for information online, since they did not describe specific instances where they had done so. To an extent, however, these adolescents may have at least *been able to* evaluate the quality of the nutrition information they received.

Overall, since they only had a basic understanding of nutrition information, and they had minimal experience searching online for nutrition information specifically, these adolescents had a low level of scientific literacy with regards to nutrition information. Fundamentally their inexperience stemmed from their use of books, rather than the Internet, to fulfill their nutrition information needs. Even when using books, they were not encouraged to formulate their own ideas about the information, since their need was to find the answer to a very specific question. This may have affected their ability to truly engage in online nutrition information-seeking: only on the most basic level, determining if information did or did not answer a question, did they analyze and evaluate the quality of the information they received on a scientific level.

Summary

In terms of being able to use the Internet to find nutrition information, there were several areas of eNutrition literacy that presented roadblocks to these adolescents. Fundamentally, their inexperience using the Internet to find nutrition information affected their overall eNutrition literacy. The most prominent effect was on their nutrition-specific information literacy, since their inexperience with finding nutrition information online prevented them from ever developing the specific search strategies to do so. Their inexperience further prevented them from being able to engage in nutrition information, including online nutrition information on any sort of scientific level; as well as from utilizing the media literacy knowledge they did possess in the actual assessment of online nutrition resources.

Additionally, although the participants knew enough nutrition information to make a correct nutrition decision, they did not utilize their nutrition knowledge in their actual food choices. Some nutrition related decisions were being made by others, namely parents. These adolescents also found it difficult to see long-term impacts on themselves of monitoring what they ate, although they did state that they *knew* there were greater implications of eating healthy, but viewed themselves as a "third-person" alternative to those effects. These factors contributed to their behavior of not regularly employing the nutrition knowledge they actually possessed, and since they were generally formally presented with their nutrition information-seeking tasks, their nutrition related health literacy skills did not extended outside of fulfilling these formally presented needs.

Underlying these weaknesses in their eNutrition literacy was the fact that the participants were usually formally presented with a nutrition information-seeking task by

their teachers. This seemed to have a large impact on their experience using the Internet as a resource, since in these cases of formal presentation, the participants were instructed to use a resource other than the Internet, namely books, and therefore they simply had not experienced using the Internet to accomplish a nutrition information task.

Further underlying their eNutrition literacy weaknesses was how formal presentation of nutrition information needs contributed to their view of what the Internet had to offer as a nutrition information resource, since formal presentation minimized the instances where the participants used the Internet for nutrition information-seeking. Instead, their experience with the Internet was engaged in social activities, including social networking, chatting, and gaming, with minimal information-seeking of any kind. Therefore, even if they had a nutrition information need that arose from their personal needs, they were unlikely to use the Internet as a source, since in their past experience they had not utilized the Internet in that manner.

Ultimately, because of their inexperience, the participants' eNutrition literacy skills were not entirely strong. Most of the participants, as well as the questionnaire respondents, had room to improve upon their various literacy skills, namely their information literacy and health literacy. This suggests that further attention should be given to improving these areas in order to help adolescents engage in the information-seeking process in a meaningful way, as well as utilize what the Internet has to offer as a resource, particularly accessibility and personalization which are benefits being lost if adolescents are minimally using the Internet as a nutrition information source.

Chapter V - Online Nutrition Information-Seeking

Notions of literacy can explain skills users have or lack when completing an online nutrition information-search and applying these skills to a process of information-seeking can provide a deeper look at the *how* adolescents find and making sense of nutrition information. In other words, the literacy skills adolescents have or do not have help explain *why* they behave in certain ways during the online nutrition information-seeking process and their behaviors during the process itself can describe *how*, or at what stages adolescents' skills are benefiting or hindering them in seeking nutrition information.

Theories of information-seeking explain different ways users might look for information and achieve their goals. The reasons why these adolescents initiated a nutrition information search, as well as their ultimate use of nutrition information, were related to the goals they were trying to accomplish, and in most cases this was to complete homework or projects assigned by their teachers. Pervasive throughout the information-seeking process were ways the adolescents' nutrition information needs seemed to conflict with their view of the Internet as a nutrition information source. Specifically, the way the Internet was used by the participants for primarily social activities caused the participants to rarely select the Internet as a resource to fulfill their formally presented nutrition information needs. Their inexperience using the Internet to find nutrition information resulted in minimal experience developing skills to sift through online information and decide what was useful and accurate. Furthermore, their entire

exploratory process was governed by the specific needs of their homework assignments or projects. This, as a whole seemed to be the underlying effect in their inability to engage in some of the benefits of the information-seeking process, namely the iterative nature of the process and the ability to refine and expand their ideas. This chapter serves to discuss these trends in detail regarding each step of the information-seeking process.

Initiation

During initiation, an adolescent becomes aware that they need information (Kuhlthau, 1991), and these participants were often motivated by others, namely teachers, to initiate a nutrition information search. Therefore, self-initiation of a nutrition information search was minimal. The fact that they were formally presented with nutrition information needs likely contributed to their feelings of nutrition being minimally relevant to their lives, since they had little involvement in creating situations where they would need or want to search for nutrition information. Fundamentally, these feelings may have resulted in their unwillingness to utilize their nutrition knowledge in their everyday lives. As a result, they had not developed the skills necessary to be able to initiate a nutrition information-search on their own terms.

When recognizing a need for nutrition information, these adolescents were most often prompted by their teachers, regardless of the final source(s) they intended to use to search for information. In the past, the participants said they were asked in school to do homework and projects relating to food or nutrition. For instance, Kelsey told a story of a time where she looked up information online for homework about the "new food pyramid," and Eddie said he once used the Internet to look up nutrition information about foods for a project about "healthy foods around the world." Projects such as these were

exemplary of the type of situations where these adolescents found themselves needing nutrition information, and their needs were clearly outlined for them. For example, for Kelsey's homework she was clearly instructed to find what the differences were between what she called "the new food pyramid" and "the old food pyramid." Therefore, to find information about the new and old food pyramids in order to complete her homework was the reason Kelsey initiated her online nutrition information search.

Less frequently, search was initiated when discussion among friends occurred that related to nutrition. For example, Will and some friends he worked out with at a track had at times discussed the foods they ate in reference to how it helped them run faster. He once sought more information after a discussion with his friends about a sports protein bar. Both Will and Eddie also had watched the movie *Super Size Me* with their friends and followed up with their parents on information they learned in that film and subsequently discussed with their friends, specifically, how it was shocking how bad the fast food in that movie was portrayed and how it affected the main character's body. This is an example of when the participants had a less formal nutrition information need. After watching the movie Will and Eddie found themselves with commentary related to the fact that the film's narrative is a rather dramatic example of the effects of fast food. Having conversations with their friends and then their parents about the film was an efficient outlet for that commentary. This type of initiation was rare, however, simply because these adolescents were not exposed to nutrition information situations like this in their normal, everyday lives.

Self-initiation of nutrition information-seeking sometimes occurred if the participants had a question about something they ate, their weight/health, or their fitness.

This seemed particularly true in Will's situation, since he visited a personal trainer and had been managing his weight for some time. This required him to think about the nutritional value of what he ate more often than the other participants. Kelsey also said that soon after she looked up information about the new food pyramid for school homework she found herself with a question about a box of Kudos granola bars her grandmother had sent her family. She questioned that although granola bars are generally considered healthy, these were covered in chocolate and wondered if they were really a suitable dessert treat rather than a healthy snack. She then sought more information from her parents so she could answer this question.

The process of searching for health and nutrition information online is largely based on ideas of self-efficacy and can also be influenced by the ideas and thoughts of outside factors (Bandura, 1986). The fact that initiation of a nutrition information search was usually prompted by teachers and not self-initiated suggests that, for these adolescents, outside factors may have been the largest influence when recognizing a nutrition information need. In the bigger picture, this resulted in a lower self-efficacy when it came to nutrition information, particularly online nutrition information, and specifically when it came to knowing where to go online and having online nutrition search strategies. Fundamentally, the lack of these skills resulted from the fact that they were being formally presented with nutrition information needs and overall felt little involvement in needing or wanting to search for nutrition information, including online nutrition information.

Furthermore, even though they possessed the ability to initiate an online search in general (also evident by their computer literacy), they did not have strong mental models

about how the Internet could be used for nutrition information and what the Internet had to offer with regards to nutrition information. Thus, they did not have a complete skill set that allowed them to foster instances where they would initiate a nutrition information search using Internet. Therefore, the Internet had not provided these adolescents that type of information, nutrition information, but rather in their experience the Internet was a place where they engaged in social activities like social networking, chatting, and gaming.

Overall, the behavior of these adolescents during the initiation stage of the information-seeking process did coincide with what previous research has suggested: adolescents seek out nutrition information for learning purposes (Kuhlthau, 1988). For these participants, those learning purposes were most often related to their school curriculum, and less often by their own initiation. It can also be said that since initiation behavior was related to a procedure affecting all members of that particular classroom as well as all cohorts of students participating in other sections of that particular class, more confidence exists that a larger group of adolescents would exhibit this behavior.

Since they were not involved with creating situations for themselves where they needed or wanted nutrition information, they had minimal skills or experience to be able to initiate a nutrition information-search on their own terms. This suggests that, for adolescents, task initiation underlies the entire information-seeking process, since this formal initiation prompted source selection and guided the information exploration process. Thus, given opportunities to foster nutrition information-seeking needs in different ways, they may be apt to select a larger variety of sources, including the

Internet, as well as engage in a more dynamic exploration of nutrition information while fulfilling their needs.

Selection

While in the selection phase, adolescents may decide on specific topics and approaches to finding information (Kuhlthau, 1991). For these participants, final topic selection was guided by the reasons they initiated their nutrition information search. For instance, when Kelsey completed her homework on the "new food pyramid" one of her final search topics was "new food pyramid." The participants also discussed a number of sources they would use to fulfill a nutrition information need and said they would be most likely to use teachers, books, parents or the Internet. They would be less likely to select friends or the media as their source. The hierarchy of source selection they created was largely due to the fact that their sources were often formally chosen for them by their teachers, which suggests that their prior experience using specific sources to search for nutrition information was having an effect on their overall source selection. As a result, they became inhibited to a small number and type of nutrition information sources, which affected their information-seeking process as a whole by minimizing their opportunity to explore and create new ideas from a variety of sources of their own choosing.

The larger group of questionnaire respondents said they had gotten nutrition information in the past from a variety of sources; and nutrition labels, parents, and teachers were the sources they had used most often (Table 6). Of the 79 respondents, 45 said they had gotten nutrition information from nutrition labels "a lot" and 16 had "a few times." Thirty respondents said they had gotten nutrition information from their parents "a few times" and 36 had gotten it "a lot." Thirty-three had gotten nutrition information

from their teachers “a few times” while 18 had gotten it “a lot.” Magazines, books, the Internet, other family and television had been used less often; and radio was a source of nutrition information that had rarely been used by most of the respondents (49 said they had never used it and only one said they had used it a lot).

Table 6.

Adolescents’ uses of sources of information about foods and beverages.

	Never	*Once or Twice*	*A Few Times*	*A Lot*	*Don't Know*
Parents	0 (0%)	12 (15%)	30 (38%)	36 (46%)	0 (0%)
Friends	23 (30%)	29 (38%)	22 (29%)	3 (4%)	0 (0%)
Teachers	8 (10%)	17 (22%)	33 (43%)	18 (23%)	1 (1%)
Other Family	12 (16%)	24 (31%)	27 (35%)	13 (17%)	1 (1%)
Books	13 (17%)	29 (38%)	21 (28%)	10 (13%)	3 (4%)
Magazines	20 (26%)	19 (25%)	21 (28%)	12 (16%)	4 (5%)
Radio	49 (64%)	12 (16%)	12 (16%)	1 (1%)	2 (3%)
Internet	19 (25%)	23 (30%)	28 (37%)	6 (8%)	0 (0%)
Television	9 (12%)	26 (34%)	27 (36%)	14 (18%)	0 (0%)
Nutr. Labels	5 (6%)	10 (13%)	16 (21%)	45 (58%)	1 (1%)

The discussions with the interview participants generally confirmed these findings from the questionnaire. However, when the interviewees talked about their source selection, they did not discuss nutrition labels as a resource they had often used to fulfill their nutrition information needs, which contradicts the fifty-eight percent of respondents who said they had “a lot” on the questionnaire. The participants talked about nutrition labels as a way that what they learned from their parents and teachers about nutrition was put to use. In other words, they said they *could* check nutrition labels to find out if a food was healthy or unhealthy, based on ingredients and information about “carbs, and sugars, and sodium kinds of things.” Based on the discussions of the interview participants, these adolescents knew that nutrition labels *could* provide them with nutrition

information. However, their nutrition information needs were not to find this kind of nutritional-value information, therefore they rarely had the need to *actually* use a nutrition label as a source of information, even though they knew labels were a common source of that information. This disparity between questionnaire respondents and interview participants may have existed for this reason: the questionnaire, which was administered in school, was answered with the "correct" answer, and the participants knew nutrition labels always had nutrition information; the interviews, on the other hand, revealed their actual inexperience using nutrition labels to fulfill their nutrition information needs.

For school homework and projects, the participants said they most often selected books because they were instructed to by their teachers. If a nutrition information search resulted from a discussion with parents, the participants said they would select the Internet to find more information or double-check information they had already discussed with their parents because it was a source that was easily accessible. If a search was initiated from a discussion with friends, these adolescents said they would select another source that they trusted to be more accurate to back up the information, usually parents or the Internet and less often their teachers or books.

This hierarchy of source selection may have been constructed from the views and experiences these adolescents had about what the Internet had to offer as a source of nutrition information. In their experience these adolescents had chiefly used the Internet for social activities, such as social networking, chatting, and gaming, but also minimally for informal information search, or for information that did not need to be used to fulfill school homework or projects that had been formally presented by their teachers. For

these informal needs, such as answering questions that arose from a participant's own thoughts, the participants were willing to use the Internet to find information. For example, when Kelsey had the question about the chocolate covered granola bars her grandmother sent, she used the Internet to find her answer.

These types of informal needs had no real consequence, in other words, in the participants' views they were not going to be penalized for being wrong, as they would on a homework assignment or project. Although it seems they should have been cautious even in these informal situations, since inaccurate nutrition information and poor food choices can affect health overall and long-term, these factors were not very relevant to the participants, evident by their behavior of not employing their nutrition knowledge in their actual food decisions.

Ultimately, these adolescents viewed sources of information as having different levels of trustworthiness and accuracy, which also influenced the hierarchy they assigned to their source selection. Teachers, books, and parents were most trusted. In their views, the Internet contained trusted information, but inaccurate information was intermingled among the accurate information. Friends and the media were less trusted and accurate than all other sources. The participants' views on these sources are something that is deserving of individual discussion, in order to paint a more comprehensive picture of how they were creating a hierarchy among sources they would select.

Teachers were viewed as trusted and accurate sources because they were in positions of authority. The participants said that school was a place where correct information was supposed to be learned and they did not say they questioned information from there. For example, Will discussed how he got accurate nutrition information from

school, and when asked if he thought the Internet could provide him with similar information about food and drink he responded:

> "Yeah, if you look on the right sites I think, and if you could find reliable sites. It definitely could, but I don't know how much more reliable it could be than getting it here at school."

Even on the Internet, if a link was somehow associated with a school it was considered more reliable. Later on in his conversation, Will elaborated upon the reason he thought this was true:

> "Because if it's on a school website, I'd most likely believe that it's truthful because I don't think that schools would put false information. Because they try to make you succeed as much as you can, so they're not going to put the wrong [information] up there."

As a whole, the participants said that information from teachers and school was truthful and accurate, which could be why teachers were a primary source of nutrition information.

Books were usually assigned by teachers and therefore they seemed to inherit the trust and credibility that the participants gave to teachers as a source of nutrition information. Will felt that unlike online sources, books took a considerable amount of time to create. He then elaborated upon how he thought there was a deeper investment in the accuracy of information coming from books:

> "Whoever is typing, I don't think that they'd like to go back again and redo all the stuff that they put false in. Because if somebody catches something [wrong] they write the author on that and I'm sure authors don't like hearing all that, and they write it right the first time."

The participants were likely to select a book if they were seeking accurate nutrition information because books were sources they were accustomed to using to fulfill their most common nutrition information needs for school homework and projects.

The participants also said they had used books to back up information they had found from other sources, including the Internet. For example, when Eddie was working on his "healthy foods around the world" project for his creative foods course, he first found ideas about cultural foods online, then found the information he actually used to develop the content for his paper by using the textbook the teacher assigned for the project.

The participants said that part of being a parent was to teach and guide your children, and therefore they thought their parents usually provided them accurate nutrition information. Similar to teachers, parents seemed to be in a position of authority and to possess a certain level of trust by default. However, one participant did feel that he was probably the person in his family who cared the most about nutrition. Will said his family did not talk much about healthy foods or invest time in monitoring what they ate. Therefore, when his parents did talk to him about nutrition he would double check that information with a secondary source, either a book or the Internet, which were both sources he used in association with his personal training program. Will's experience deviated from the experiences of the other participants, who would select their parents as a source of nutrition information to back up information they had found from less trusted sources such as the Internet and friends.

As a whole, these adolescents did not view their friends as reliable sources of nutrition information. Therefore, friends were not selected as sources for nutrition information. There were instances when friends provided nutrition information, such as when Will discussed the benefits of a particular sport protein bar with several friends of his he ran with at a track. However, this was not solicited information. Friends seemed

to be the most informal source of any type of information, and even for informal nutrition information needs, friends were an insufficient resource. For example, Will sought more information from the Internet at the website he used in tandem with his personal training program after the protein bar discussion he had with his friends, because he did not fully trust the accuracy of what his friends had to say.

When asked if he would trust nutrition information coming from his friends, Will said: "I wouldn't believe any friend. I don't believe a lot of what my friends say." In Eddie's experience, however, his friends had proved to be credible in the past so he said he might trust them if they were making claims about nutrition. Yet the majority of these participants would not take what their friends said about nutrition at face value and they said they would select another source of nutrition information to back it up, such as their parents or the Internet.

Similarly, the media, namely television, was also not viewed as a source of credible information. The participants recognized that that the media may have represented food unrealistically, may have been motivated by selling a product, or may not give comprehensive information about a food's nutritional value. Television was said to be a source of entertainment and was viewed as a very informal source of information. Similar to how they viewed their friends, nutrition information from the television was insufficient to fulfill even informal nutrition information needs, evident by the fact that none of the participants said they had or would select the television as a source of nutrition information in any case.

Previous research has noted the Internet as a primary information source for adolescents (Lenhart & Rainie et al., 2001; Lenhart & Simon et al., 2001). However, the

ways these adolescents discussed their experience on the Internet was as a social place where they would social network, chat, and play games. The Internet was a place that contained information, but their view of online information was affected by the fact that many individuals contributing to online information were not qualified to be providing that specific information. In the experiences of these participants, it seemed the social functions of the Internet dominated the information functions, which could have contributed to their view of online resources as informal, since they rarely ever used the source to fulfill their formally presented nutrition information needs for school homework or projects.

When these participants did select the Internet as an information resource it was because of its accessibility. However, since anyone could contribute to information online, the nutrition information found there was not completely trusted and credible. The participants would often select support from sources that were said to be more credible, such as parents or teachers. Furthermore, conflicting information online decreased the credibility of this source because the adolescents thought they would have to put in a decent amount of work to gauge what nutrition information was true, which they viewed as being difficult.

The participants thought the fact that the Internet could provide many sides of an issue was a good thing, but sometimes encountered uncertainty if they had to figure out which view was right. For example, Kimmi explained how it made her feel when she found conflicting information online:

> "It kind of frustrates me because I just want to know the answer…So it's like hard to, like, find the right thing. And people could be, like, making this up, so I really don't know."

The participants would sometimes adopt a "majority rules" attitude toward making decisions using information from the Internet. This is a decision that they did not feel they needed to make when consulting a teacher, parent, or a book. It seemed that the participants had stronger mental models about what teachers, parents, and books had to offer as nutrition resources, than they did about the Internet as a nutrition resource. It is important to note, too, that it is not known if the participants had much experience actually engaging these analytical skills they had knowledge of. If they had not actually had experience gauging the validity of online information, yet knew they should be, this may have created a lack of confidence in using the Internet as a nutrition information resource. This might have been because they knew they would have to put forth effort to make decisions and it was simply easier to use sources they already knew would be accurate.

Overall, previous research has suggested a variety of reasons adolescents would prefer the Internet as a source of health information, including nutrition information: because it offers privacy (Gray et al., 2002; Morris, 2001; Rideout, 2001), anonymity (Gray et al., 2005a), and reduces embarrassment (Skinner et al., 2003, 1997). However, these benefits were not addressed by the participants with regards to seeking nutrition information online. Instead, their conversations focused on the qualities the Internet possessed for the actual *act* of seeking information (e.g., qualities as a search tool and qualities of the information itself). Privacy, anonymity, and protecting themselves from embarrassment were not necessary considerations when fulfilling their mostly formal nutrition information needs.

Overall, the Internet was not the preferred source to select to fulfill a nutrition information need. Inexperience using the source was the largest contributor to this behavior, and led to a preferred use of familiar sources, particularly books, for nutrition information. The participants created a hierarchy of sources that was largely based on the fact that their sources were usually selected for them by their teachers. As a result, they most often used books, which minimized their opportunity to explore and create new ideas from a variety of sources of their own choosing, which are some of the benefits of this model of information-seeking. This suggests that because of their source selection habits, these adolescents were not participating in a true nature of the information-seeking process: finding and engaging with information from many different types of sources.

Exploration

During the third phase of the information-seeking process, adolescents seek out information about their general topic (Kuhlthau, 1991); and they may also ask questions and information relating to different search terms may be explored using their selected sources. These adolescents did not participate in very much of the iterative nature of this phase, since initiation of a search and source selection were often structured by others. With respect to the Internet, the participants did engage in some iterative interaction with search engines when searching for information online, although they had minimal experience doing this with nutrition information specifically. Overall, the foundational stages of the information-seeking process, initiation and selection, were impeding their ability to full engage in nutrition information exploration.

Regardless of the sources the participants selected to fulfill a nutrition information need, they were often being guided in their selection of questions or the terms to search for to find information within those sources. For instance, when Kelsey worked on her homework about the "new food pyramid", she had specific questions she needed to answer that were provided to her. One of these questions was to explain the difference between the "new food pyramid" and "the old food pyramid." This situation is exemplary of the kinds of questions these participants asked about nutrition, questions that were presented to them on a sheet of paper as homework or project objectives. Exploration of new topics was not an option in these situations, because the ultimate outcome had been decided by someone else, specifically a teacher.

This phenomenon also occurred when it came to source selection. For example, at the time of his interview, Eddie was working on a project in his creative foods course that related to "healthy foods around the world", where he had to complete papers related to foods in different sections of the world. He said he was asked to write a paper that addressed a food dish of his choosing from a specific area, such as Asia or Europe, and talk about its contents and its nutritional value. For this project, Eddie was instructed to use the textbook provided in that course because it contained nutrition notations about various ingredients. Similarly, Catie remembered homework she did in her health class where she simply used the textbook, because that is what they "always did." These instances where they were guided to use a specific source did not afford the participants the opportunity to refine their ideas and explore new directions, both very powerful activities in the nutrition information-seeking process, and defining activities of the exploration stage specifically.

As somewhat of an outlier to the experiences of the other participants, Eddie did have some freedom in choosing the food to write about for his paper, and he said he used the Internet to explore for topic ideas. For example, he typed in "southeast Asia foods of the world" into a search engine and then explored various sites from there until he found a recipe he was interested in. Once he found a recipe, he used the textbook as instructed to assess the nutritional value of the ingredients in the dish.

This behavior built upon the skills these adolescents possessed as part of their general information literacy, such as their developed strategies to find general information online, as well as their computer literacy, such as the ability to use a computer and the Internet. As previously discussed, the participants had minimal experience searching online for nutrition information, but when using the Internet to search for information in general, they spoke of instances where they adapted and modified their search terms when using a search engine if their initial search did not produce valuable results, which is consistent with existing literature (Guinee et al., 2003). When asked to imagine what they would do if they had to search online for nutrition information, the participants said this behavior would likely be transferred to a nutrition information search, although they had not yet had much experience doing this. Due to their lack of nutrition specific information literacy, the participants did not know enough about the types of information and places to find nutrition information to start an online nutrition exploration conceptually. Conceptual thought could also have been affected by the fact that nutrition information needs rarely arose in the participants' every-day lives, which meant they were less likely to engage the Internet for finding nutrition information,

since they viewed the Internet as source that could chiefly fulfill these types of informal, everyday needs.

Since these adolescents were usually formally presented with a nutrition information need, such as for school homework or projects, they did not participate in thinking about nutrition information on their own terms, which left little opportunity for refining ideas and exploring new directions. Thus, even though they had the skills to use the Internet to explore general information and refine their ideas, with regards to nutrition information they were inhibited by the structured way in which nutrition tasks and sources were presented to them.

Formulation

Formulation is said to be the turning point of the information-seeking process (Kuhlthau, 1993), where a topic is narrowed and users make choices about what they deem relevant. These participants engaged in general information-seeking processes where they sifted through information from traditional sources, such as books, as well as the Internet deciding what was important to fulfill their information needs. They translated this knowledge to nutrition information-seeking, however they had minimal experience actually doing this, especially online. Essentially, these adolescents knew that the books that were being assigned to them contained the information they needed, often in the chapter they were specifically assigned to use. Therefore, focus formulation was being impacted by the formal way nutrition information seeking needs and sources were presented, which resulted in little need to sift through nutrition information and contributed to their lack of developed skills to do so during the information-seeking process.

When completing a nutrition information search for school the participants were usually instructed to use a specific part of a specific source. Catie elaborated on the homework she had done for her health class: "We used a different chapter for each homework we had, and the teacher told us." The chapters Catie used were picked because they related to the topic and goals of that week of class, and in this case there was not much opportunity or need for sifting through information since only one source was provided. This was the case in the experiences any of the participants discussed where they had used books for information, including nutrition information. They found it easy to use books for information, including nutrition information, because their use was guided and they knew the information found there was relevant to their information needs, and they did not have to sort through information.

When working on his healthy foods around the world project, Eddie used the Internet to search for cultural foods to write an essay about. He used a search engine to explore multiple websites. Eddie checked out most of the websites that were produced on the first page of his search for "southeast Asia foods of the world." Some of the participants used a "click and choose" method to decide which links to click on from a search engine page, or in other words they chose haphazardly expecting trial and error to be part of the process of finding relevant Web sites and information. Other participants had a more analytical approach, such as Eddie who looked for key words in the description the search engine generated beneath each link (e.g., Gray et al., 2005b, Guinee et al., 2003).

As Eddied viewed each website on the search engine page for his "southeast Asia foods of the world" search, he decided if the Web page was relevant by scanning the

information. If a lot of text was present on a Web site, the participants as a whole thought information was more difficult to sift through, because they preferred to deal with less text. Will also felt that a greater amount of text opened the door for repetitive information, which he found frustrating. The participants said it was easy to tell if a Web site provided relevant information if that site had keywords related to their search in headers and titles or even bolded on the page.

These adolescents also said that they found it especially easy when a Web site provided important information in an image, chart, or graph. Catie had a preference for these types of sites because it was simple to immediately decide if the Web site contained relevant information, since she did not even have to spend time scanning through the text. Previous research has suggested that adolescents have conflicting design preferences for health information Web sites (Franck & Noble, 2007), yet these participants all agreed in the desire to see important information highlighted in some manner, either through clearly emphasized text or images, charts, and graphs.

Over time, the participants started to learn how valuable information from certain Web sites was, so when those sites turned up in a search they spent less time gauging if it was worthwhile to check the information from those sites. For instance, Seth knew that although Wikipedia contained a lot of information it was "a rather dubious source" and that he could probably only use the information found there as a guide and would have to double check facts elsewhere. Likewise, Eddie knew that health.com was relevant if he was in need of a description of an illness like a cold or the flu. Eddie even said that when he had looked for information about how long the flu lasted he skipped the search engine process altogether because he knew health.com would have the information he needed.

This behavior has been found to be prevalent among adolescents as part of their "dot-com strategy" (Guinee et al., 2003).

In the formulation stage of general information-seeking, these adolescents utilized mental models they had as part of their general information literacy, such as their strategies for finding general information online. However, their minimal experience in searching the Internet for nutrition information, or weakness of their nutrition specific information literacy, made it difficult to attest to specific methods they had actually used to sort through online nutrition information. When asked to imagine what they would do if they had to search for a specific kind of nutrition information online, they did relate the online nutrition information searching process to searching for online information in general, and several of the participants thought sorting through online nutrition information would not be different than sorting through other online information.

Based on their experiences sorting through general information online, these participants viewed it as more difficult to decide what online information was important compared to information they found from other sources, such as books. These adolescents possessed uncertainty about the validity online information in general. With regards to nutrition information specifically, they were more certain that the information coming from assigned textbooks was going to be useful and accurate for their needs than they said they would be of online nutrition information. They expressed that a longer process to determine the usefulness of information found online was required, and their preference for brevity online may have been contributing to their views about the Internet as a tedious information resource.

The fact that the participants had a basic level of health literacy, and nutrition literacy specifically, to be able to make educated health decisions should have helped mitigate some of their uncertainty about the validity of online health and nutrition information. However, since they did not find themselves with the need to make nutrition decisions in their normal, everyday lives, they did not feel as though they could be experts in that kind of information, as they could feel experts in information about the things they do engage in everyday, such as sports they play or music they listen to. For example, Will described a time he corrected online information about a favorite band:

> "If you look up something [on Wikipedia] you can change it, like, right there. I know I have, because I found a lot of wrong information on Wikipedia on bands and stuff that I like, that I know for a fact is right so I [change it and] put it on there."

Will was very confident about the accuracy of the online information about his favorite bands, but in his interview he did not extend that confidence to online nutrition information.

Overall, these adolescents did not spend much time focusing their thoughts or making choices about whether or not nutrition information was relevant, no matter the source. This was due to the fact that their nutrition information-needs and sources were formally provided by others, and they were confident and satisfied that those sources would provide them with exactly the information they needed. In contrast, the Internet had a likelihood of providing irrelevant information and the act of finding relevant information required what the participants viewed as a great deal of work. These adolescents did not have much experience engaging with the Internet in that manner, but rather for social activities. Therefore, during their information-seeking process, they were less likely to use the Internet as a source of information to begin with, and seemed

to only have knowledge of skills they would use to sift through online nutrition information, such as reading search engine descriptions and looking for information highlighted in images, charts, or graphs, rather than actual experience doing so.

Collection and Presentation

Collection and presentation of nutrition information, including nutrition information found online, was associated with the motivations the participants had for initiating a search in the first place. Gathering of the information needed to fulfill a nutrition information need was generally guided by the source assigned by a teacher, and the primary use of nutrition information was for homework and projects related to school. The participants had minimal experience having nutrition queries outside of those presented by school; therefore, they did not commonly use nutrition information they found for other reasons. Ultimately, online information was viewed as less formal than nutrition information from books, and therefore it was used in a different manner.

Sometimes, yet far less often than for school-related purposes, the participants used the nutrition information they found online for their own edification. For example, Kelsey once used nutrition information she found online about a box of chocolate covered granola bars to make a decision about their health value. This was a personal need for Kelsey; therefore the Internet was an acceptable source to use since there was no real consequence to being wrong, as there was with a more formal, school-related need. To review, in the adolescents' experience the Internet had not been a source of absolutely

valid information, rather, the Internet was used for social reasons and had provided more informal information.

These adolescents did use the nutrition information they found online differently than the nutrition information they found from other sources, such as books. Nutrition information found online was rarely used in school projects or homework, partially due to the fact that sources for projects and homework were generally assigned. Therefore the participants used designated textbooks to fill that information need.

Furthermore, the participants were less confident about the accuracy of the nutrition information found online. For school homework or projects where there was a penalty for being wrong, the participants did not use the Internet for a source because they knew the books they were being assigned would contain the correct information. Online nutrition information was more confidently used to fulfill a personal need, such as Kelsey's granola bar question mentioned above.

Ultimately, the formal way in which these adolescents were presented with nutrition information needs governed the ultimate use of the information they encountered, and primarily that use was for school homework and projects. The participants would use the Internet to fulfill their more informal, personal needs, however. Similar to the exploration and formulation stages of the information-seeking process, collection and presentation were largely influenced by the initiation and selection stages. This suggests that these adolescents needed more diverse motivations for beginning a nutrition search, and perhaps specifically more personal reasons, to really engage the Internet as a source and to use the information they found there.

Summary

The manner in which these adolescents were formally presented with nutrition information-seeking needs was an underlying force to the difficulties they encountered in the information-seeking process. This formal presentation caused initiation to be almost solely to find information to fulfill school homework or projects and source selection to be limited to assigned textbooks, which impeded being able to explore multiple sources and formulate specific foci or ideas of their own choosing. This formal presentation also governed the way the nutrition information they encountered was ultimately used, again to complete homework or project assignments.

For these adolescents, the Internet was primarily a place where they engaged in social activities, which was a second underlying force to their information-seeking process difficulties. Since in their experience they were not using the Internet to get nutrition information, even to fulfill their formally presented nutrition information needs because they were being assigned other sources of information, they simply did not perceive the Internet as a place to go for nutrition information. Although they viewed the Internet as a place that could provide information, they knew that online information needed to be sifted through since much of it could be inaccurate or irrelevant. There was therefore a likelihood of being wrong when using online information, including nutrition information, which was not a chance the participants wanted to take for their formal needs, but was acceptable for their more informal, personal nutrition information needs where there was no relevant consequences to being wrong.

These two trends coupled to inhibit these adolescents from engaging in the rich iterative thought and decision-making processes that are characteristic of an information-seeking model like Kuhlthau's (1993). The structured manner in which they were

presented nutrition information needs and information sources did not cultivate independent thought about the topic, which in turn may have further cultivated the distanced feelings they felt towards nutrition's relevance to their lives. If they were not having reasons to think about nutrition information on their own terms, it makes sense that these adolescents would feel little need to utilize the Internet, an information source that they were used to using on their own terms for social reasons. Therefore, even if their nutrition information-seeking process had been otherwise rich and successful using books, which in the case of these participants it was not, since they had little experience using the Internet for that purpose, the Internet would not play a major role in the information-seeking process overall.

Chapter VI – Nutrition Needs and the Internet as a Source of Information

As previously mentioned, two trends emerged as underlying the difficulties in the information-seeking process and contributing to deficiencies in these adolescents' eNutrition literacy: 1) these adolescents primarily had formal nutrition information-seeking needs and 2) these adolescents used the Internet to fulfill primarily personal needs. Since these trends seemed to have such a marked effect on the ways these adolescents were finding and making sense of nutrition information, the foundation of each of them is deserving of individual discussion, which is the purpose of this chapter.

Formal Presentation of Nutrition Information Needs

The way these adolescents were usually only formally presented with nutrition information needs seemed to have the greatest effect on their information-seeking process, since this trend guided the ways they selected and interacted with sources, and even how they ended up using the information they encountered. This formal presentation affected the ways they defined nutrition, and caused the topic to be thought of in terms of school rather than in terms of nutrition's applicability to their everyday food choices. As a whole, these adolescents had minimal experience with nutrition information outside of the formal, educational setting, which ultimately inhibited them from formulating new ideas and questions during the nutrition information-seeking process, simply because the way they were presented with a need, sources, and ultimate use of the information did not require them to.

These adolescents formed ideas about what nutrition was and how it was useful through information and experiences from sources that they seemed to view as formal, which were primarily teachers and books. Previous research by Kaye (1995) defined formal information sources as having "some regularized or legal manner in relation to the user" (p. 13). Informal sources, on the other hand, do not have this foundation. The participants said teachers were in a position of authority where they were expected to provide accurate information; and books were most often assigned by teachers and therefore information from those sources was trusted as well.

Although in previous health information research family has been viewed as an informal source of information (e.g.,Gray et al., 2005a; Kaye, 1995; Wathen & Harris, 2006), parents were viewed by these participants as possessing a similar level of authority as teachers, the adolescents expected that their parents would not mislead them, but rather they were there to guide them in life, and therefore nutrition information provided by parents inherited a similar level of assumed trust. As a result, the participants considered nutrition information from their parents as valid.

For these participants, part of their relationship with nutrition information was that it could be provided by all three of these sources, teachers, books, and parents, and they did not often question the information received from them. This means that the participants associated accuracy and trustworthiness as functions of being a formal source of nutrition information. Existing health research has also defined nutrition information received in an educational setting as formal (Abbot, 1997) and for these adolescents, their views of nutrition as a topic remained a part of this formal setting.

When the participants had nutrition information needs they were most often prompted by teachers. For example, Catie and Kelsey both completed nutrition related homework and Eddie talked about a "healthy foods around the world" project he worked on for his creative foods course. For these formal nutrition information needs the participants used textbooks they were assigned in class to fulfill those needs. For example, Catie, Kelsey, and Eddie all used textbooks assigned by their teacher to complete their homework or project.

Since these adolescents were primarily learning about, receiving information from, and generating nutrition information needs from teachers and assigned textbooks, they associated their ideas of nutrition with school. Seth said that school is where he "really learned" nutrition information during the nutrition unit of his health class; and for all of the participants, school is where they learned basic definitions of the term as well as basic skills to be able to make correct decisions about what was healthy and unhealthy to eat. In other words, in the experience of these adolescents, the topic of nutrition was something they thought about in a school setting, more so than something they thought about in their normal, everyday lives.

These adolescents had the skills to make correct health decisions, however they did not often implement their knowledge and skill set into their actual food choices. They conveyed a "third-person effect" with regards to both caring about the topic of nutrition, they felt they cared more than their peers, as well as to the potential ramifications of poor food choices, they knew what the ramifications could be, yet felt that many adolescents were exempt from those effects at this point in their lives. It was

clearer that they simply did not feel nutrition was very important to them, although they admitted that it should be.

Overall, these adolescent simply did not have much experience with nutrition information outside of the formal, educational setting and, as a consequence, this created a somewhat insufficient level of health literacy which ultimately impacted their ability to engage with nutrition information in any meaningful or analytical way during the information-seeking process. This translated to their everyday behavior by causing them to not integrate their nutrition knowledge into their food choices. This suggests that this formal view of nutrition as a topic is very important to change if adolescents are going to assimilate nutrition information-seeking and healthy food choices into their lives.

The Internet as an Informal Information Source

In contrast to the formal way these participants were presented with nutrition information needs, the Internet was a source of generally informal information. In fact, in their experience the Internet was a place where they primarily engaged in social media, chatting, and playing games, with only minimal information search of any kind. Therefore, a conflict existed between the formal way these participants were used to receiving nutrition information and the social way they engaged with the Internet. Thus, beyond the fact that they were being instructed to use other sources besides the Internet to fulfill their information needs, their overall experience with the Internet did not provide them with the idea that online sources would be preferred sources to use to fulfill a nutrition information need if given the option.

Previous research has classified the Internet as both a formal and informal source of information, depending on the user's relationship to the information at hand (Kaye,

1995). These participants did view the Internet as an information resource, but information search was not an everyday use of the tool. Rather, social networking was *the* primary function, as well as chatting and gaming. Catie even said that the Internet was a place where she did "everyday life" things, which was also true for the rest of the participants unless they had specific reasons to use the Internet for other tasks. Therefore, the Internet was simply not regularly used for the purpose of finding information related to nutrition, although the participants knew that this was something the Internet offered.

In their experience searching for information in general, the participants said they thought the Internet contained both accurate and inaccurate information. They even had knowledge of tactics to gauge if an online resource was trustworthy, such as checking for citations, checking multiple sources for consistency, and considering the author of the information. (These behaviors are discussed thoroughly in the eNutrition literacy chapter).

Questioning of accuracy was not a process the participants said they needed to engage when receiving nutrition information from a source they viewed as more formal such as teachers, books, or parents. It seemed that needing to engage in this process of determining accuracy caused them to have uncertainty about the validity of the Internet as a nutrition information source (this phenomenon is discussed in the eNutrition literacy chapter). For their formally presented nutrition information needs, there was consequence to using inaccurate information, and the participants thought the books they were assigned to fulfill their needs were definitely going to provide them accurate information. Therefore, there was little reason to use another source, especially the

Internet, since in their experience they had always found the information they needed to fulfill their needs from books.

Although their use of the Internet for nutrition information was minimal, they thought the Internet as a general resource was proximal, could easily provide multiple sides of an issue, and could serve as an outlet for everyday people to share information. Although these were noted as benefits, these factors also fostered the uncertainty the adolescents felt towards the validity of the Internet for information, including nutrition information. The participants had stronger mental models regarding what the assigned books had to offer them as nutrition resources and felt more confident about information from those sources overall to fulfill their formally presented nutrition information needs.

Another contributing factor to their selection of other nutrition resources over the Internet was the fact that their nutrition-specific information literacy was lacking, and the participants did not know where to go online to find nutrition information. They had developed certain online search strategies in the past, such as checking out sites using the "dot-com" formula and searching for search terms and phrases that represented exactly the type of information they would need to find. However, they simply had not had enough guidance or experience with nutrition information specifically to feel confident in knowing where to find that kind of information online or to develop online search strategies specific to that type of information. This inexperience using the Internet in this manner was likely due to the way their nutrition information needs and sources were formally presented to them. As a consequence of this, even if given the option to use the Internet as a source during the nutrition information-seeking process, these adolescents

may be likely to encounter difficulty in knowing where to go to find information that is relevant to their needs.

For more informal or personal nutrition information needs, the participants were willing to use information from this source that they viewed as more informal, such as the Internet. For example, after she completed her homework on the "new food pyramid" Kelsey found herself with a question about the health value of a chocolate covered granola bar, which she then used the Internet to fulfill. This need was not associated with school homework or a project, therefore, given that these adolescents did not see the long-term ramifications of unhealthy food choices, there was little relevant consequence to using the information she found online, even if it happened to be wrong.

Several participants were at times be willing to use information from online sources that they knew could be inaccurate, such as Wikipedia. However, they would not use a source like Wikipedia for the foundational information for school related work, and if they did find information from there they said they would double check it or expand upon it with another more trusted source, such as a book, before turning their project in or feeling confident the information was true. Again, this reinforces the fact that they preferred to use sources that they knew would be accurate when fulfilling their formally presented nutrition information needs, and this did not include the Internet.

Fundamentally, the primary experience these adolescents had online was socially based, through social networking, chatting, and gaming. They were relatively inexperienced with online nutrition information-seeking, and viewed the Internet as primarily being able to provide them informal information, since there was a high likelihood that information could be opinion or inaccurate. Overall this discouraged them

from utilizing the Internet as a source of nutrition information, since they needed accurate information to fulfill their formal nutrition information needs. Therefore, these adolescents were missing out on utilizing a potentially very valuable source of nutrition information during the information-seeking process, since by nature the Internet can offer the opportunity to engage in many different viewpoints and foster new and unique ideas and opinions. Yet for these adolescents, those characteristics were actually deterrence from using the Internet as an information source.

Summary

For these adolescents their views of nutrition as a topic, a topic they largely ignored unless they were prompted by others, and the Internet as a resource, a resource they primarily engaged in activities they initiated themselves (social networking, chatting, and gaming), clashed with each other. This affected the information-seeking process by offering the adolescents little freedom to engage with nutrition information on their own terms. They were guided to search for specific information using specific sources, which rarely included the Internet. Therefore, they simply did not view the Internet as a place they would easily find the nutrition information relevant to fulfilling their formal nutrition information needs, because they had not experienced the Internet in that manner. Ultimately, this deterred these adolescents from integrating the Internet into their nutrition information-seeking process.

Overall they found it easier to use other sources such as books for nutrition information because of the fact that their use was guided. Information-seeking on the Internet required them to make judgment calls and be confident that their own knowledge was helping them make educated decisions. Yet, they were not quite secure in the fact

that the nutrition knowledge they possessed was accurate enough to determine the validity of an online source. This suggests that a key to improving adolescents' online nutrition information-seeking process is gaining an even deeper understanding of the interactions of these two perceptions. eNutrition literacy skills, while undoubtedly important, can only bring adolescents so far into engaging with online nutrition information as long as they feel nutrition is largely irrelevant to their everyday lives. Increasing their use of the Internet for nutrition information-seeking to fulfill their formally presented needs for school, as well as finding out ways to make the topic of nutrition less "formal" and more relevant to adolescents' everyday food choices is vital to allowing them to fully engage in the online nutrition information-seeking process.

Chapter VII – Conclusions

Overall, for these adolescents, the nutrition information-seeking process was not an engaging, iterative process. Their nutrition information-seeking behaviors indicated that these adolescents were only at a basic level actually finding and making sense of nutrition information. Specifically, they were being prompted by fulfilling formal, academic needs, guided in their source selection and their ultimate use of the information they did encounter. As a consequence of this they were missing out on exploring a variety of sources of nutrition information on their own, as well as being able to formulate new ideas about the topic and subsequently return to other stages of the information-seeking process to refine their ideas.

This behavior has consequences within Kuhlthau's theoretical framework, which was the foundation for this project. Namely, both the initiation and selection stages were major roadblocks for these adolescents when participating in an online nutrition information-search. This was due to the fact that these adolescents were really only formally presented with nutrition information needs and sources to use to fulfill those needs. Thus, their motivations were so guided that they had essentially no opportunity to really engage in the exploration and formulation stages of the information-seeking process. Information exploration and formulating new ideas are the heart of Kuhlthau's model, and foster its iterative nature. Thus it is important to find ways to get adolescents

to participate in these stages, which means providing them with more reasons to seek nutrition information beyond homework and school projects.

The participants did have some strong eNutrition literacy skills throughout the process of online nutrition information-seeking. They could read online information (traditional literacy), although they preferred to read small amounts of it and liked to see important information highlighted in images, charts, graphs, headers, and bolded text rather than bulk text. These adolescents also had a sufficient level of computer literacy to use computers and the Internet to accomplish online information-seeking tasks.

However, the literacy components that would truly help them engage in the exploration and formulation stages of the online information-seeking process were lacking. Specifically, they may not have had experience applying the media and health literacy knowledge they possessed. For example, they knew they should be gauging the validity of online nutrition information sources by checking the authors of Web pages, looking for supporting sources, and looking for consistency across Web pages. However, they were unable to talk about actual instances where they had done this. Also, they did not utilize the nutrition knowledge they possessed in their actual food choices. Therefore, they may have encountered difficulty had they been more thoroughly engaging in the exploration and formulation stages of the online nutrition information-seeking process, given that online information needs to be assessed for credibility, and the fact that they only had a basic understanding of nutrition information could have made it even more difficult to understand what was relevant.

Underlying their use of the Internet specifically during the information-seeking process was their minimal experience using it as an information-seeking tool for nutrition

information. Largely, their online experience was on social networking sites, as well as for chatting and gaming. Therefore, had they been engaging in exploration and formulation, they still may not have chosen online resources to do so, since they were simply not used to receiving nutrition information from the Internet.

The implications of these behaviors for this type of information-seeking process are important. Foremost, for the process to be impactful and successful, initiation and selection behaviors need to be targeted, since they have posed such a roadblock to the more engaging aspects of the process. Furthermore, considerable skills building needs to occur in order for adolescents to be able to sift through online nutrition information and feel confident that the decisions they make about what is relevant and accurate are correct. Finally, relating nutrition to adolescents outside of academic situations is important to build health literacy, which will be vital in getting adolescents to understand and apply nutrition information they encounter during the online information-seeking process. Overall, a stronger foundation of nutrition knowledge and using the Internet for information-search needs to be built in order for nutrition information-seeking to become important to adolescents, as well as to teach adolescents how to successfully engage in information exploration and the formulation of new ideas relating to nutrition.

Future Avenues for Research and Instruction

As Brown and Witherspoon (2002) suggested, there are still plenty of steps to be taken to build the body of research, create effective communication campaigns, and improve health literacy among adolescents. All of these avenues will build confidence and skills for adolescents to more actively participate in the nutrition information-seeking

process, and work towards reconciling the conflict between the way adolescents view nutrition and they way they use the Internet as a resource.

The role of teachers is important since, as it stands, the majority of adolescents' nutrition information needs arise from school. Fundamentally, teachers should undergo training regarding health Web site assessment and should focus on understanding where useful online nutrition resources are located. Teachers should use meta-sites such as usda.gov to find trustworthy, up-to-date online nutrition information.

Teachers should prioritize assigning the Internet as a source of information in health homework and projects to increase adolescents' exposure to online nutritional sources. Time should also be allotted in nutrition-related courses to the review of good quality, reliable nutritional Web sites such as myfoodpyramid.gov, nourishinteractive.com, and empowerme2b.org. Nutrition instructors should also encourage their schools to develop a portal on their Web sites to these quality sources so adolescents can easily access them.

Teachers should focus their strategies on helping adolescents assess online resources with more confidence. This includes exposing them to a greater amount of, and possibly more complex, nutrition information so they are certain they possess the right knowledge to be able to know if nutrition information claims in online sources are accurate, without feeling the need to turn to teachers, books, or parents for aid. Critical assessment skills for online information should continue to be taught in the classroom and instruction should give focus to the assessment of specific online nutrition sources. This can teach adolescents to harness their media literacy skills in actual nutrition

information assessment, rather than let the idea of assessment discourage them from using online sources.

Online nutrition information should be disseminated through the online social spaces where adolescents already participate. Facebook groups can be created by classrooms, athletic teams, and interested sets of students as places to share nutrition related opinions and ideas. Teachers could also create MySpace pages for their classrooms as a great way to direct their students to engage with each other as well as with nutrition information online. Finally, the discussions initiated by teachers or other authority figures managing these spaces should focus on talking about nutrition in the specific ways it affects adolescents. For instance, how it makes sense in ways that they care about, such as their sports or their social lives. Integrating nutrition information into the online social activities adolescents are most comfortable with can bridge the gap to the informational spheres associated with nutrition, leading to greater exposure to nutrition information, and potentially a greater understanding of and incorporation of that information into their everyday habits.

Professional nutritionists and dietitians can also mirror the efforts of teachers by utilizing social media in their practices to promote ideas about nutrition. They should also create Facebook fan pages or MySpace pages to connect interested young people to more advanced nutritional topics than they might be exposed to in school. Teachers can review these social media information outlets from trusted professionals with their classrooms, which can help adolescents build the skills to recognize trustworthy information in these user-generated information spheres.

Finally, parents should support these efforts by encouraging their adolescent children to use online resources to answer nutrition-related questions asked at home. Parents should also promote regular thought about food choices by involving their children in decisions and conversation about food and drink that is prepared inside the home or purchased at the store. Advancing this type of behavior at home, where the majority of food decisions are made, can not only start to integrate nutrition-related through into their everyday lives, but they can also build self-confidence about their nutritional knowledge. This knowledge can then be more confidently applied to the assessment of online nutrition information, and ultimately work to engage them more in what the Internet has to offer as a nutrition information resource.

Social-Desirability Effect

Since a researcher was present, the participants may have felt they should answer questions in a specific way or they may have left information out of their responses. This may have been especially influential because the interviews were conducted at their schools. The belief that there were "correct" answers to the interview questions could have been especially pervasive since the topic was nutrition, since the participants viewed the topic in a good versus bad, or healthy versus unhealthy dichotomy. If the data had been collected using another method, such as a group conversation in an informal setting, their answers could have been entirely different.

Social desirability may have been prevalent throughout the discussions these adolescents had about nutrition. Although, from the researcher's perspective, the participants were not being untruthful about their relationships with and thoughts about nutrition, information-seeking, and their use of the Internet; however, they may have

been purposefully digging deep into their experience to find things to say that would be relevant, so as not to appear as if they did not care or did not think about these concepts. For instance, the discussion Will said he had with his friends about the benefits of a specific sports protein bar may have actually been quite brief and insignificant, however, this may have been the only example he could have given of a time he talked about nutrition with his friends. This could have been the case with more of the examples the participants gave, since from their perspective providing no example would suggest that they did not feel nutrition was important, which they noted was a topic they knew *should* be important. The prevalence of the "third person effect" regarding caring about nutrition, these adolescents said they cared more than their peers, and the effects of poor food choices, the participants noted these effects, but felt people their age were somewhat immune to those effects at this point in their lives, further indicates the participants' desire to appear as though they cared about nutrition.

Ultimately, this suggests that adolescents' relationship with nutrition information and online nutrition information-seeking may be even less sophisticated than what they indicated by digging deep for examples. The two trends that emerged out of the minimal examples they could give of searching for nutrition information online would still hold true if the examples the adolescents gave were the only examples they had. Specifically, the fact that they were usually only formally presented with nutrition information needs would remain true, since it is known that they are, in fact, specifically given homework regarding nutrition in school and they could not provide many examples where they had sought nutrition information otherwise. Furthermore, their experience with the Internet was primarily social, and they said they had minimal experience using the source for

nutrition information-seeking. This trend is actually enhanced by the idea that they may have been digging deep within their experience to find examples to relate to questions asked during the interviews.

Other Methodological and Analytical Considerations

The chosen methodology also carried certain limitations, mainly the generalizability of results. Since only six participants were explored in-depth, the results of this study are not representative of the larger population of adolescents, and is a small sample from which to draw out patterns, even within qualitative research that generally uses smaller sample sizes. This analysis, then, should be approached as an exploratory examination of the relationships among adolescents, nutrition information-seeking, and the Internet that can lead to suggestions for further research. In spite of the small number of interviews, some clear patterns of how this specific group of adolescents sought nutrition information with a specific focus on the role of the Internet emerged. These patterns are are useful in suggesting approaches to take when creating nutrition Web sites for adolescents and ways to provide training for adolescents who seek nutrition information. Analysis of the interview data may have also been influenced by the in-depth interview method itself, since a person with a different interest or background in nutrition and information seeking could have interpreted the data differently.

The participating classrooms were recruited from middle schools in the Fort Collins area, based on the availability of the classrooms who taught a class related to nutrition. In the case of the present study, this resulted in students who all had a similar background of nutrition education, at least from the perspective of what they learned in school. Adolescents from other school districts with different nutrition courses could

have different experiences, skills, and knowledge that allowed them to participate differently in the nutrition information-seeking process.

Final Thoughts

There are still great strides to be made to fully engage adolescents in thought and conversation about what they are eating and drinking and how it affects their health. Building a dynamic among adolescents to support each other in good food and drink choices will not be easy; however, it is probably the most effective way to increase relevance of the topic and ultimately to develop a strong foundation for healthy eating choices throughout their lives. Since these adolescents had a thoroughly social construction of their online activities, taking advantage of that may be the easiest way to get them to listen and use information regarding nutrition. Targeting the ways these adolescents already prefer to engage online, which is through social outlets, could get them talking to one another about nutrition topics more often. The more they are talking about nutrition, the more likely it is that they are thinking about nutrition, which could lead to the ability to actually implement their nutrition knowledge in food choices.

Figuring out how to connect adolescents to health and nutrition ideas in ways they are already engaging with the Internet will also create interesting opportunities for developers wanting to work on societally relevant projects. Furthermore, the prospect of engaging social media outlets to accomplish this is not only exciting, but will possibly be very effective in making nutrition socially relevant among adolescents and will truly take advantage of their inherent social nature. Ultimately, as we strive to improve their overall health and well-being, we need to truly be listening to what our young people say about how and where we can reach them at levels and places they will be responsive.

After all, they know best what it is that they need and want and how they prefer to engage with the information around them.

Appendix A

Interview Protocol

Introductory Comments

Researcher

Hi, my name is [researcher's name]. I'm from Colorado State University and wanted to talk with you today about how you get information about what you eat and drink. It's nice to meet you again and thank you for volunteering to do this study.

I'm going to ask you to respond to some questions about nutrition. Our conversation will be audio taped. Is this okay with you?

Participant

[Answers]

Researcher

Thank you. There are some snacks and drinks on the table that you can have. Please take whatever you want and however much you want.

When I start to ask you questions, please respond as honestly as you can. Remember that as we talk there are no right or wrong answers, so just think carefully about your own personal opinions when you answer. Also remember, you don't have to worry about anyone besides the two of us and one other researcher knowing exactly what you say.

All of the answers you give me will be anonymous and it is okay to say your name during the interview because your name will later be replaced by a code-name. If you get confused at any time during our conversation, it is okay to stop and ask me questions too. Do you have any questions now, before we begin?

Ice-breaker Questions

Q1. Do you ever think about what you eat and drink?

Probe 1a: Why/why not?

Q2. Do you like to use the Internet?

Probe 2a: What is your favorite thing to do online?

Q3. What does “nutrition” mean to you?

Probe 3a: Is it important to you?

Interview Schedule

Q4: Have you ever had questions about what kinds of food or drink are healthy or unhealthy?

Probe 4a: What were they?

Probe 4b: What did you do when you realized you had these questions?

Q5. Tell me what or who makes you think about what you eat and drink.

Q6. If I asked you to find out if Pepsi was good or bad for you, what would you do?

Probe 6a: What questions would you think of to help you in your search?

Q7. Say you found some sources that said Pepsi was good for you and some sources that said Pepsi was bad for you. What would you do?

Probe7 a: How would you figure out what’s important?

Probe 7b: How would you figure out what information to trust?

Probe 7c: How do you feel when you find conflicting information like this?

Q8. Have you ever looked online for information about what you eat and drink?

Probe 8a: [If Yes] Tell me an example.

Probe 8ab: What questions did you think of the help you in your online search?

Probe 8b: Do you like to use the Internet to find nutrition information? Why or why not?

Probe 8c: Do you think the Internet is better or worse than other ways to find nutrition information? Why?

Q9. How much conflicting information do you find on the Internet?

Probe 9a: Would you say the Internet has more, less, or about the same amount of conflicting information as other sources, like books or friends?

Probe 9b: How do you decide what online information is important?

Probe 9c: How do you decide what online information to trust?

Q10. If you made the decision that drinking Pepsi is good for you, what would you do with that information?

Q11. If a book told you that Pepsi was good for you, would you then feel that you were right, for example, in sharing that information with your teacher?

Probe 11a: If source from the Internet told you that Pepsi was good for you, would still tell your teacher? Why or why not?

Probe 11b: What if a friend told you that Pepsi was good for you? Would you still tell your teacher? Why or why not?

Q12. Is there anything else about nutrition or finding nutrition information that you would like to talk about?

Closing Comments

Researcher

Thank you for talking with me. What we have talked about in this interview will help figure out how to make nutrition resources for teenagers like you. All of the questions we talked about were asked because they help us figure out the ways and reasons how and why you get nutrition information. Your participation has been very important. To thank you, we want to give you these two movie tickets.

What I'm handing to you now is a sheet that explains what you just volunteered to do and what you are responsible for since you volunteered.

Please do not discuss this study or your responses with anyone until April 1, 2007. We will be administering the study to other participants and do not want their responses to be biased as a result of having prior knowledge of the study.

If you have questions or are upset about being a part of this study, the bottom of this sheet contains the information for the people you need to contact for answers or help.

Thank you again and have a great day.

Appendix B

Parental Consent Form

Cover Letter

Department of Journalism and Technical Communication
Colorado State University

The Department of Journalism and Technical Communication at Colorado State University is conducting a study about how adolescents find nutrition information. We would like to get your child's input on the way teens get nutrition information. Knowing your child's opinions about getting nutrition information will help us to create effective nutrition information resources for teens like your child.

In the first part of the study, your child will be given a questionnaire about nutrition information. Your child might then be asked to participate in an interview to talk more about how he or she looks for nutrition information.

There are no known risks associated with participating in this study and your child's participation is entirely voluntary. He or she may stop participating at any time. If your child does participate, it will talk about 15 minutes to completing the questionnaire and 45 minutes to complete the interview. Both of these will occur during one of your child's normal class periods.

We would like to ask that you return these forms to school with your child by [date]. He or she should turn them in to [teacher's name]. Even if you do not wish for your child to participate, please send these forms back to school.

If you have any questions regarding this study, please feel free to contact the study coordinators:

Jessica Larsen (970) 491-0280
Cindy Christen (970) 491-6469

Thank you for your help with this research.

Consent Form

Consent for Your Child to Participate in a Research Study
Colorado State University

TITLE OF PROJECT: Adolescents and Nutrition Information-Seeking: The Role of the Internet

PRINCIPAL INVESTIGATOR: Dr. Rosa Martey
Department of Journalism and Technical Communication
970-491-6469

CO-PRINCIPAL INVESTIGATOR: Jessica Larsen
Department of Journalism and Technical Communication
970-491-0280

WHY IS MY CHILD BEING INVITED TO TAKE PART IN THIS RESEARCH?
Your child is aged 14-15 and in the 8th or 9th grade; and he or she has learned about nutrition at school.

WHO IS DOING THE STUDY?
This study will be conducted by Jessica Larsen, a Graduate Student in Technical Communication at Colorado State University.

WHAT IS THE PURPOSE OF THIS STUDY?
This research study examines how adolescents find and use nutrition information. The goal of this research is to better understand how nutrition information is found in order to create better nutrition resources for adolescents.

WHERE IS THE STUDY GOING TO TAKE PLACE AND HOW LONG WILL IT LAST?
The study will take place at [insert name of school]. The questionnaire part should last about 15 minutes and the interview should last about 45 minutes. Both the survey and the interview will occur during regular school hours where your child will be excused from normal class in order to participate.

WHAT WILL MY CHILD BE ASKED TO DO?
Your child will first be asked to take a survey. This survey will ask your child about different ways he or she might find nutrition information, demographic information, and assesses your child's literacy level. Your child may then be asked to participate in an interview in order to talk more about the ways he or she finds nutrition information.

ARE THERE REASONS WHY MY CHILD SHOULD NOT TAKE PART IN THIS STUDY?
There are no known reasons why your child should not take part in this study.

DOES MY CHILD HAVE TO TAKE PART IN THE STUDY?
Your child's participation in this research is voluntary. If you decide to grant consent for your child to participate in the study, you may withdraw your consent and have your child stop participating at any time without penalty or loss of benefits to which you or your child are otherwise entitled.

WHAT WILL IT COST ME AND MY CHILD FOR MY CHILD TO PARTICIPATE?
There is no monetary cost to you or your child for your child to participate in this study. The only cost is approximately 60 total minutes of your child's time.

WHO WILL SEE THE INFORMATION THAT MY CHILD GIVES?
We will keep private all research records that identify your child, to the extent allowed by law. Your child's information will be combined with information from other children taking part in the study. When we write about the study to share it with other researchers, we will write about the combined information we have gathered. Your child will not be identified in these written materials. We may publish the results of this study; however, we will keep your child's name and other identifying information private.

Your child will be asked to put his or her name on the written survey. Your child will then be given an alias (e.g., Participant 1) and tracked by this alias during data analysis. Names will also be exchanged between the researcher and your child during the audio taped interviews. However, once the interviews are transcribed, your child's name will be replaced with its appropriate alias. Every effort will be made to prevent anyone besides the Principal Investigator and the Co-Principle Investigator from viewing the original tapes. Only the alias will be used when results of this study are shared with other researchers.

We will make every effort to prevent anyone who is not on the research team from knowing that your child gave us information, or what that information is. For example, your child's name and alias will be kept separate from his or her research records and these two things will be stored in different places under lock and key. You should know, however, that there are some circumstances in which we may have to show your child's information to other people. For example, the law may require us to show your information to a court.

CAN MY CHILD'S TAKING PART IN THE STUDY END EARLY?
Besides withdrawing consent, there is no known reason why your child's taking part in the study would end early.

WILL MY CHILD RECEIVE ANY COMPENSATION FOR TAKING PART IN THIS STUDY?
As a payment for your child's participation in the survey, once data collection is complete the researcher will return to your child's classroom to talk about nutrition information. Those children who are asked to participate in the interviews will receive snacks during the interview, as well as two free adult movie tickets to a local movie theatre.

WHAT HAPPENS IF MY CHILD IS INJURED BECAUSE OF THE RESEARCH?
There is no known reason why an injury should occur during this study. However, the Colorado Governmental Immunity Act determines and may limit Colorado State University's legal responsibility if an injury happens because of this study. Claims against the University must be filed within 180 days of the injury.

WHAT IF I HAVE QUESTIONS?
Before you decide whether to grant consent for your child take part in the study, please ask any questions that might come to mind now. Later, if you have questions about the study, you can contact the investigator, Jessica Larsen at 970-491-0280. If you have any questions about your child's rights as a volunteer in this research, contact Janell Barker, Human Research Administrator at 970-491-1655. We will give you a copy of this consent form to keep for your records.

WHAT ELSE DO I NEED TO KNOW?
In order for your child to participate in this study, we must receive a signed copy of the child's agreement form in addition to this parental consent form.

Your signature acknowledges that you have read the information stated and willingly sign this consent form. Your signature also acknowledges that you have received, on the date signed, a copy of this document containing _3_ pages.

PARENTAL SIGNATURE FOR MINOR

As parent or guardian I authorize _____ (print name) to become a participant for the described research. The nature and general purpose of the project have been satisfactorily explained to me in the attached letter and I am satisfied that proper precautions will be observed.

_____
Minor's date of birth

_____
Parent/Guardian name (printed)

_____ _____
Parent/Guardian signature Date

Appendix C

Questionnaire Protocol

Introductory Comments

Researcher

Hi, my name is [researcher's name]. I'm from Colorado State University and wanted to meet with you today to find out how you use the Internet. It's nice to meet you and thank you for volunteering to do this study. I'm going to ask you to answer a few questions about yourself.

Here is a pencil and your questionnaire. This questionnaire is going to ask you about your Internet use and then some information about who you are. Please answer all of the questions and answer them as honestly as you can. There are no right or wrong answers, so just think carefully about your own personal opinions when you answer.

Also, please only write your name on the first page of the questionnaire I am giving you. This will help in keeping your information private.

Questionnaire

Cover Sheet.

Name:_____

Questions.

[Alias (e.g., Participant 1)]

I would like to ask you for your opinion about how you find nutrition information. For each statement, please circle the one answer which best reflects your opinion.

1. How often do you look on the Internet for information about your health?

Never Rarely Occasionally Frequently Always

2. How often do you think that what you are eating and drinking is doing things to your body?

Never Rarely Occasionally Frequently Always

3. How often do you think that what you are eating and drinking is changing the way you feel?

Never Rarely Occasionally Frequently Always

4. How much do you think about what you eat and drink?

Never Rarely Occasionally Frequently Always

5. How important is it for you to be eat well so you can look good?

Not at all important Somewhat important Neutral Very important Extremely Important

6. How important is it for you to eat well so you can play sports?

Not at all important Somewhat important Neutral Very important Extremely Important

7. Have you ever look on the Web at information about foods or beverages?

Never Once A few times A Lot Don't Know

I would now like to ask you for your opinion and about your experience using the Internet for information about what you eat and drink. For each statement, please circle the one answer which best reflects your opinion and experience right now. [note to committee: this is eNutrition literacy scale]

8. How useful do you feel the Internet is in helping you in making decisions about what you eat or drink?

Not useful at all Not useful Unsure Useful Very Useful

9. How important is it for you to be able to find information about nutrition on the Internet?

Not important at all Not important Unsure Important Very Important

10. I know what information about nutrition is available on the Internet.

Strongly Disagree Undecided Agree Strongly Agree
Disagree

11. I know where to find Web sites that give me helpful information about nutrition.

Strongly Disagree Undecided Agree Strongly Agree
Disagree

12. I know how to find Web sites that give me helpful information about nutrition.

Strongly Disagree Undecided Agree Strongly Agree
Disagree

13. I know how to use the Internet to answer my questions about nutrition.

Strongly Disagree Undecided Agree Strongly Agree
Disagree

14. I know how to use the nutrition information I find on the Internet to help me.

Strongly Disagree Undecided Agree Strongly Agree
Disagree

15. I have the skills I need to know if the nutrition resources I find on the Internet are useful or not useful.

Strongly Disagree Undecided Agree Strongly Agree
Disagree

16. I can tell which Web sites have nutrition information I can believe and trust.

Strongly Disagree Undecided Agree Strongly Agree
Disagree

17. I feel confident in using some of the information I find on the Internet to make decisions about what I eat and drink.

Strongly Disagree Undecided Agree Strongly Agree
Disagree

I would now like to ask you to tell me a little bit about yourself. Please fill in the blank spaces or circle the answer to the following questions.

21. What is your age? _____

22. What grade are you in? _____

23. Are you: Male Female

24. What is your race?
(Circle all that apply)

White

African-American

Hispanic

Asian-Pacific Islander

Native American

Other (Please Indicate): _____

25. Have you ever taken a health class before, inside or outside of school?

Yes No

If yes, how old were you when you took this class?

_____

Thank you!

Closing Comments

Researcher

Thank you for sharing this information about yourself and how you feel about nutrition information. What I'm handing to you now is a sheet that explains what you just volunteered to do and what you are responsible for since you volunteered.

Your answers will help figure out what kind of nutrition resources to make for teenagers like you. Your participation has been very important.

The questions in the questionnaire about nutrition information were asked in order to be sure that you have looked for nutrition information at least once before and see the different ways nutrition might be involved in your life. Also, you were

asked if you have taken a health class before because we wanted to be sure that you have been given some formal information about nutrition before we look at the answers to the other questions. All of the questions were asked because they help us figure out the different ways and reasons why you get nutrition information

What I'm handing to you now is a sheet that explains what you just volunteered to do and what you are responsible for since you volunteered.

Please do not discuss this study or your responses with anyone until April 1, 2007. We will be administering the study to other participants and do not want their responses to be biased as a result of having prior knowledge of the study.

If you have questions or are upset about being a part of this study, the bottom of this sheet contains the information for the people you need to contact for answers or help.

I look forward to seeing you all again in few weeks so we can talk about good ways to find nutrition information online. Have a great day.

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