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# Perceptions Related To Healthful Eating And Physical Activity Among Eastern Illinois University Students

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PERCEPTIONS RELATED TO HEALTHFUL EATING  
AND PHYSICAL ACTIVITY AMONG EASTERN  
ILLINOIS UNIVERSITY STUDENTS

ZAUCHA

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Perceptions Related to Healthful Eating and Physical  
Activity Among Eastern Illinois University Students  
(TITLE)

BY

Wendy N. Zaucha

**THESIS**

SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS  
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YEAR

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Perceptions Related to Healthful Eating and Physical Activity Among Eastern

Illinois University Students

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## Abstract

The purpose of this study was to explore Eastern Illinois University (EIU) students' (a) perceived barriers to achieving healthful eating, (b) misconceptions about nutrition, (c) perceptions of the importance of healthful eating and regular physical activity and (d) perceptions of their own efforts to achieve healthful eating and regular physical activity. Three hundred-nine usable surveys were collected from students in an introductory nutrition course (Nutrition and Well-Being) during the first week of the 1998 spring semester. The survey was adapted from the American Dietetic Association 1997 Nutrition Trends Survey. Results indicate that many EIU students perceive the following as barriers to achieving healthful eating: (a) a lack of desire to give up favorite foods (b) negative nutrition instruction, (c) lack of time, (d) satisfaction with current eating habits, and (e) confusion over conflicting studies. Many EIU students seem to hold the misconception that there are "good" and "bad" foods and to perceive favorite snack foods to be "bad" foods. The majority of EIU students appear relatively apathetic towards the importance of healthful eating and regular physical activity and appear to be exerting little effort to develop either behavior. Educators may need to use a more positive, "user-friendly" approach to nutrition education to help students believe that healthful eating and regular physical activity are feasible. Using positive nutrition language for nutrition guidelines, showing students practical ways to achieve healthful eating and regular physical activity and showing students immediate benefits of healthful eating and regular physical activity may help them develop these behaviors. This approach may need to be somewhat tailored for individual needs of male and female students, and of students who do and do not eat most of their meals in on-campus dining services.

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## Introduction

College is a time of new found independence for many young adults. Individuals living on their own away from parental guidance must now develop their own lifestyles, including eating and health habits. Eating habits are important contributors to an individual's risk for chronic diseases including heart disease and certain cancers. Organizations such as the American Heart Association and the American Cancer Society recommend diets low in fat and high in fiber to reduce the risk of such chronic illnesses. College students appear to be developing eating habits that would put them at risk for these diseases. Researchers (Mitchell, 1990; Skinner, 1991; Huang, Song, Schemmel & Hoerr, 1994) have reported that college students consume diets low in energy, high in fat, and inadequate in fruits, vegetables, and milk.

College students are faced with many challenges to developing healthy eating habits. Several factors identified by researchers (Brevard & Ricketts, 1996; Koszewski & Kuo, 1996) that may place students at nutritional risk include financial problems, meal skipping, fad diets, frequent consumption of snack foods, and limited intake of high nutrient dense foods. Lack of knowledge and misconceptions about nutrition can also contribute to poor eating habits. A primary goal of most introductory college nutrition classes is to equip students with the necessary knowledge to achieve healthful eating habits and lifestyles. Unfortunately, possession of nutrition knowledge does not ensure that healthful eating habits will be put into practice. According to a 1990 study (Mitchell), only 45% of college students surveyed indicated that they had made dietary changes specifically because of a basic nutrition course, yet students' post-semester tests indicated that the course had helped them learn a great deal about nutrition. A possible explanation for these results could be the existence of misconceptions related to nutrition. There does appear to be a negative correlation between knowledge and misconceptions (Chery, Sabry & Woolcott, 1987), but studies (Chery et al., 1987; Mitchell, 1990) have

shown that some students displaying high levels of nutrition knowledge may still hold a number of misconceptions about nutrition.

The existence of barriers to healthful eating can also contribute to poor eating habits and lifestyles. The American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997) explored factors American adults perceived to be barriers to healthful eating. Major obstacles cited by adults surveyed included lack of availability of healthy foods, lack of willingness to give up certain foods, confusion over dietary reports and advice, and a lack of understanding of the guidelines for diet and nutrition.

Attitudes about the importance of healthful eating and lifestyles also affect behavior. Several researchers (Vickery, Phillips & Crenshaw, 1985; Patterson, Kristal, Lynch & White, 1995) have observed a positive relationship between perceived importance of healthful eating and actual dietary adequacy. It follows that individuals' perceptions of their own efforts to achieve healthful eating also affect dietary behavior. Vickery and associates (1985) observed that students often held inaccurate perceptions of their dietary habits, often overrating their adequacy. These misperceptions can lead to complacency with poor dietary habits.

Physical activity is also an important factor in the prevention of some chronic diseases including heart disease and certain cancers. Researchers (Melby, Femea & Sciacca, 1986; Schulz, 1988; Frost, 1992; Kelley, 1995; Haberman & Luffey, 1998) have found the majority of college students studied to be sedentary, increasing their risk for developing a chronic disease. This low level of activity does not appear to be related to a lack of exercise knowledge, much as poor dietary habits are not necessarily related to lack of nutrition knowledge. Melby and associates (1986) observed that college students appear to be knowledgeable about exercise and Frost (1992) observed that the majority of students recognized the role of exercise in preventing cardiovascular disease. Factors such as students' perceived importance of physical activity, and perceptions of personal

efforts to achieve regular exercise and physical activity patterns, may affect the development of regular exercise and physical activity patterns. These effects may be similar to the effects that eating perceptions, discussed earlier, may have on developing healthful eating behavior.

The purpose of this study was to explore Eastern Illinois University students' (EIU) (a) perceived barriers to achieving healthful eating, (b) misconceptions about nutrition, (c) perceptions of the importance of healthful eating and physical activity and (d) perceptions of their own efforts to achieve healthful eating and physical activity. The definition of the college population varies from study to study. Age ranges as narrow as 19-22 years of age and as wide as 18-41 years of age have been used in studies of the college population. The age range of 17-25 years of age was chosen for this study.

The following primary objectives were addressed: (a) identify factors EIU students perceive as barriers to achieving healthful eating and (b) explore EIU students' misconceptions about diet and nutrition. The following secondary objectives were addressed: (a) identify EIU students' perceptions of the importance of healthful eating and regular physical activity; (b) identify EIU students' perceptions of their personal efforts to achieve healthful eating and regular physical activity; and (c) investigate potential differences in perceived importance, personal efforts, misconceptions, and barriers between male and female EIU students, and between college students who eat at least 61% of their meals at on-campus dining services (on-campus diners) and those who do not (off-campus diners).

Knowledge of these perceived barriers and misconceptions related to healthful eating, and of perceptions about healthful eating and physical activity, can assist college educators in developing curricula and methods to address these issues. Also, information addressing differences in these factors between male and female students, and between on-campus and off-campus diners, can better equip educators to address students as individuals with varying educational needs. It is important for nutrition educators not

only to provide students with knowledge about healthful eating and lifestyles, but also to help them find solutions to problems they may face in achieving healthful eating and lifestyles. The results of this study may help give educators an indication of what issues students need to resolve to develop healthful lifestyles.

## Review of Literature

Beginning in 1991, the American Dietetic Association (ADA) has been conducting biennial nutrition trends surveys of American adults. The primary intent of these surveys is to keep "a finger on the pulse of America's attitudes and behaviors" (American Dietetic Association, p.1). The ADA hopes that results will point out the causes of the gap between public attitudes about nutrition and behaviors regarding nutrition, and specific "misconceptions about diet and nutrition and obstacles to achieving a healthful lifestyle" (p. 1-2). Results of the American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997) have recently been released. The ADA surveyed Americans 25 years old and over, excluding the typical college age population. Students are presented with a unique set of challenges as they enter a time of new found independence and responsibility in the university setting. As a result, the college population is often studied separately to identify attitudes and behaviors distinct to this stage of life.

The purpose of this study was to explore college students' perceived barriers to achieving healthful eating, misconceptions about nutrition, perceptions of the importance of healthful eating and physical activity, and perceptions of their own efforts to achieve healthful eating and physical activity. Relatively little research exists relating to these areas specifically among the college population; however, literature exists on dietary behavior, attitudes, and knowledge of college students. The following review explored the existing literature on nutrition behavior of college students and various influences on this behavior including: barriers to developing healthful eating, misconceptions related to healthful eating, knowledge related to healthful eating and physical activity, and perceptions of the importance of personal diet and physical activity among college students. Differences in all of these areas between males and females, and between on-campus and off-campus residents were also addressed.

### Nutrition Status and Dietary Behavior of College Students

The dietary behavior of college students is affected by unique circumstances. Unique living arrangements, social lives and daily schedules in this stage of life, all affect the dietary behavior of college students, separating this age group from the adult population. Researchers have increasingly explored the dietary behavior of college students, to see what kinds of behavior are prevalent in this life stage. Dietary practices of college students including meal and snack patterns, supplement usage, and intake of nutrients such as calcium and iron have been studied by several researchers (Jakobovits, Halstead, Kelley, Roe & Young, 1977; Driskell, Keith & Tangney, 1979; Marrale, Shipman & Rhodes, 1986; Melby et al., 1986; Hertzler & Frary, 1989; Hoffman, 1989; Tilgner & Schiller, 1989; Hertzler & Frary, 1992; Cohen, Ches, Peters, Budde & Dirks, 1994; Huang et al., 1994; Huang, Hoerr & Song, 1997; Keim, Stewart & Voichick, 1997). Results seem to indicate that many college students are not practicing healthful eating habits.

Sporadic meal patterns appear to be common among college students (Driskell et al., 1979; Melby et al., 1986; Hertzler & Frary, 1989; Huang et al., 1994; Huang et al., 1997). Driskell and associates (1979) studied 150 students at Virginia Polytechnical and State University and found that 73% of students reported eating only one meal a day, with the remaining participants eating two meals a day. A contributing factor to sporadic meal patterns among college students may be missing breakfast. Cohen and associates (1994) reported that of 1175 students surveyed, 64.7% reported that they did not eat breakfast every day, and 16.7% reported that they did not eat breakfast at all. Huang and associates (1997) collected 24-hour food records from 2628 young adults enrolled in an undergraduate nutrition course. Results revealed that 20% of male participants and 22% of female participants skipped breakfast. Studies (Driskell et al., 1979; Melby et al., 1986; Hertzler & Frary, 1989; Huang et al., 1994) also indicated that the majority of

students snack at least once or twice a day. Favorite snacks reported included carbonated or alcoholic beverages, popcorn, potato chips, candy bars, cookies and fruit such as apples. High fat snacking may be common. In a study by Cohen and associates (1994), 31.2% of 1175 students surveyed reported eating mostly high fat snacks.

Unfortunately, fruits and vegetables are not present often enough in college student snacking. Melby and associates (1986) observed that 69% of students studied failed to eat fruit at least once per day, and 43% reported eating vegetables less than once a day. Schuette, Song, and Hoerr (1996) also observed low intakes of fruit among college students studied, with 33% consuming no fruit in a one day period. Cohen and associates (1994) observed similar results among residence hall students with only 3% of students achieving the number of servings recommended by the Food Guide Pyramid (United States Department of Agriculture, 1992). The fruits and vegetables that are consumed may not be the most nutrient dense choices. A study by Keim and associates (1997) indicated that orange or grapefruit juices and french fries, fried potatoes and green salads were the fruits and vegetables chosen most often by young adults. These choices are relatively low in fiber and other nutrients in comparison to whole oranges or grapefruits, and to other vegetable choices such as broccoli and carrots.

Sporadic meal consumption and low nutrient dense snacking as described in these studies may make it difficult for students to receive adequate nutrients. Researchers (Jakobovits et al., 1977; Driskell et al., 1979; Hoffman, 1989; Tilgner & Schiller, 1989; Hertzler & Frary, 1992) have found that calcium and iron are two nutrients consistently underconsumed by college students. Driskell and associates (1979) collected biochemical data from 150 college students during the spring quarter of 1977. Hemoglobins and hematocrits were determined from blood obtained via finger pricks. Twenty-four hour recalls were also collected from each participant. Students were divided into three groups including males, females who had never taken oral contraceptives, and females who had used oral contraceptives for at least a year. Low hemoglobin levels were observed in



2.0% of men, 3.8% of women who had never taken oral contraceptives, and 2.1% of women on oral contraceptives. Low hematocrit levels were observed in 8.0% of men, 17.0% of women who had never taken oral contraceptives, and 8.5% of women on oral contraceptives. Thirty-eight percent of women, and 36% of women on oral contraceptives reported consuming less than 10 mg of dietary iron daily which is well below the Recommended Dietary Allowance (RDA) (National Research Council, Food and Nutrition Board, 1989) of 15 mg.

Jakobovits and associates (1977) studied seven-day food records of female students at Cornell University, and found similar low intakes of iron. They also found that only 39.5% of participants met at least two-thirds of the RDAs for energy, protein, calcium, iron, vitamin A, thiamin, riboflavin, niacin, and ascorbic acid. In more recent studies, Tilgner and Schiller (1989) observed that female college athletes had intakes of calcium below 70% of the RDA, with non-athletes displaying the lowest intakes. Hertzler and Frary (1992) observed similar results in analysis of 280 three-day diet records of nonnutrition majors in a basic nutrition course. Mean intakes of iron, calcium, vitamin A, and vitamin C were below 70% of the RDA.

Poor dietary habits are not restricted to underconsumption of various nutrients. Overconsumption of fat contributes greatly to the risk of cardiovascular disease, obesity, and certain cancers. The current recommendation for the consumption of fat as a percent of total calories is 30% or less (U.S. Department of Agriculture, Department of Health and Human Services, 1995). Studies (Short & Short, 1983; Hoffman, 1989; Hertzler & Frary, 1992) clearly indicate that many in the college population exceed this recommendation. A study conducted by Hoffman (1989) of 300 students enrolled in an upper-level nutrition course at Central Michigan University indicated that 61% of students consumed more than 30% of their total calories as fat. Hertzler and Frary (1992) observed that 31% of the 280 students studied consumed more than 35% of total calories as fat. Short and Short (1983) studied university athletes' dietary intakes and found that

the mean percent of calories consumed as fat among football players ranged from 38-42%. These studies indicate that overconsumption of fat is a common problem among college students. More regular meal patterns could help alleviate this problem.

According to a study by Huang and associates (1997) women who ate breakfast were more likely to have daily fat intakes less than or equal to 30% than were women who skipped breakfast.

Supplement use could also easily contribute to overconsumption of certain nutrients. Several researchers have examined supplement use among college students (Jakobovits et al., 1977; Driskell et al., 1979; Schulz, 1988; Hertzler & Frary, 1989; Eldridge & Sheehan, 1994). Jakobovits and associates (1977) observed that 34% of students studied at Cornell University used at least one nutrient supplement, the most common being a multi-vitamin with iron. Almost a third of these students were taking two or more supplements on a regular basis. For a number of students, this resulted in excessive intakes of certain vitamins and/or minerals in excess of recommended amounts. Schulz (1988) also observed potentially dangerous supplement usage among college students. Schulz observed that 12% of 147 supplement users surveyed took megadoses (greater than 1000% of RDAs) of various nutrients, or took unorthodox supplements such as lecithin and grapefruit formulas. Such doses of supplements could place individuals at risk for vitamin and mineral toxicities, particularly if megadoses of fat soluble vitamins are being consumed. A possible reason for the use of supplements in this manner was noted in a study by Eldridge and Sheehan (1994) in which men tended to believe that taking more vitamins than provided for in the RDAs would protect their health..

All of these studies indicate that many college students are practicing potentially unhealthy dietary behaviors. Sporadic meal patterns, unhealthy snacking, underconsumption of certain nutrients, the overconsumption of fat, and the overuse of supplements, could all place students at nutritional risk. Researchers are now looking for factors that may contribute to such dietary behaviors.

### Barriers to Achieving Healthful Eating

The existence of obstacles or barriers to achieving healthful eating is one possible explanation for college students' poor dietary behavior. A multitude of different factors could serve as barriers to achieving healthful eating based on what a person perceives to be a difficulty. Barriers could include anything from limited availability of nutritious food to a lack of willingness to change certain dietary habits. A discussion of potential barriers to healthful eating follows. Because there is little research available on barriers to healthful eating specifically among the college population, literature on barriers to healthful eating among the adult population will also be addressed.

The American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997) identified several factors adults perceive to be barriers. Fear of giving up favorite foods, confusion and frustration over nutrition studies and reports, and the belief that a balanced diet takes too much time, all ranked as "top inhibitors to healthful eating" (p. 4). Recently, several researchers (Dittus, Hillers & Beerman, 1995; Lloyd, Paisley & Mela, 1995) have also explored factors that serve as barriers to healthful eating among the adult population. Lloyd and associates (1995) examined barriers to the adoption of reduced-fat diets in a UK population, in a twenty-week intervention study of 61 subjects. Mean belief scores prior to dietary changes indicated that subjects believed reduction in taste to be a potential problem in the reduction of intake of cakes and biscuits, changing to reduced fat products and reduced fat spread, reducing intake of meat, and using reduced fat milk. After making changes in fat consumption, subjects reported that their new lower fat diets did indeed taste worse than their higher fat counterparts. Subjects also initially believed that changing to reduced fat spreads would be more expensive, but found after making the change that this was not the case. Subjects did however, find that cost was a barrier to incorporating more fruits and vegetables into their diets.

Dittus and associates (1995) also examined barriers to fruit and vegetable consumption among the adult population and found that disbelief that fruits and vegetables have cancer-preventing attributes, an inability to prepare fruits and vegetables, concern about agrichemicals, and cost served as barriers. A lack of perceived benefits was observed among some subjects, but perceived barriers were found to be more strongly related to nutrition behavior than perceived benefits. This indicates that education may need to emphasize suggestions to overcome behavior related barriers more strongly than the benefits of a particular food.

Some literature (Saunders & Rahilly, 1990; Koszewski & Kuo, 1996; Range, 1996) is available on barriers to healthful eating among college students. Koszewski and Kuo (1996) examined factors influencing food consumption behavior of college women from medium sized universities in upstate New York and central California. A questionnaire and brief food frequency test were used to gather data. The results indicated that adequate time to eat and ability to obtain food at a good value influenced the nutritional adequacy of subjects' diets. In a more specific study, Saunders and Rahilly (1990) performed a cross-sectional study of university health and non-health majors, examining specific factors influencing intentions to reduce fat and sugar intake. Factors found to hamper restriction of fat and sugar intake included attitudes such as fear of failure and personality and mood changes as a result of fat and sugar restriction, and prior negative experiences to modifying one's diet. Also, in an unpublished Master's thesis, Range (1996) observed that negative attitudes associated with the time available for fruit and vegetable intake may act as a barrier. These results indicate that negative attitudes can serve as barriers to achieving healthful eating styles.

Cost of healthful eating has been identified as a barrier to healthful eating by participants in several studies (Dittus et al., 1995; Lloyd et al., 1995). McAllister, Baghurst and Record (1994) performed a cost analysis study to determine if healthful diets of Australians are in fact more expensive than less healthful ones. Average diets

were analyzed and the average cost determined. Costs were then estimated for healthful diets planned using guidelines similar to the United States Department of Agriculture Food Guide Pyramid recommendations. McAllister and associates concluded that healthful eating is not necessarily more expensive, but education is needed to show people how to restructure their diet rather than using a direct substitution approach to making changes to their existing diets.

All of these results indicate that the existence of barriers can contribute to poor eating habits. Whether it be fear of giving up favorite foods or limited availability of healthful food choices, education is needed to address ways of overcoming these barriers. More research is needed on barriers to healthful eating specific to the college population to better focus education efforts for this audience.

#### Misconceptions Related to Diet and Nutrition

Misconceptions about nutrition can hamper an individual's ability to achieve healthful eating styles. The American Dietetics Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997) indicated that misconceptions exist among American adults. Seventy-two percent of Americans surveyed believed that foods are either "good" or "bad," 38% believed that body weight is an indicator of a healthy diet, and 35% believed that vitamin supplements are necessary to ensure good health. Research (Miller, Coffman & Linke, 1980; Cypel & Prather, 1993) indicated that college students also may hold misconceptions about nutrition.

Cypel and Prather (1993) studied the food perceptions of college students using a convenience sample of 605 students. Students' perceptions of the functional properties, health properties, and technological properties of various foods were explored through a multi-dimensional food perception questionnaire. Health properties included nutritiousness, energy value, goodness, processing, and biologic origin of various foods. Students perceived foods such as tuna, lettuce, chicken, and most dairy products as being more nutritious, lower in calories, better for you, and more unprocessed than foods such

as cola or chocolate. Students perceived high starch items such as pasta, potatoes, rice, and bread as being relatively bad for you, high in calories, not nutritious, and more processed. Cypel and Prather concluded that students may overlook the fiber, vitamin and mineral contents of high starch foods, because of these misconceptions. Miller and associates (1980) observed similar misconceptions about high starch foods. Thirty-seven percent of students studied at New York University reported eliminating carbohydrate sources from their diets for weight reduction. Miller and associates concluded that this was a result of the misconception that bread and other starches are "fattening."

The American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997) also explored health perceptions of various foods among adults. Ninety-two percent of Americans surveyed believed that fruits and vegetables have very healthful effects, 62% believed dried beans, peas and lentils have very healthful effects, and 61% believed pasta, bread and rice have very healthful effects. These results indicate that American adults' health perceptions of grain foods such as bread and pasta are not consistent with the results of studies of college students by Cypel and Prather (1993), and Miller and associates (1980) which indicated that college students perceived these types of foods to be high in calories, and fattening.

Being knowledgeable about nutrition does not necessarily prevent the occurrence of misconceptions. Chery and associates (1987) examined nutrition knowledge and misconceptions among Canadian University students in 1984 and compared them to students of 1971. The level of knowledge was found to be higher in 1984, but the prevalence of misconceptions in 1984 was similar to that of 1971. Areas in which students held misconceptions were nutritive value of processed foods, protein needs of active versus inactive people, iron, acidic fruits and stomach acidity, bran cereals and bowel health, natural versus refined sugars, margarine versus butter, and the nutritive value of raw eggs versus cooked eggs. Although this study showed a negative correlation between knowledge and misconceptions, a 1990 study by Mitchell indicated that applied

human nutrition majors still held a number of misconceptions, despite having taken several nutrition courses. Some of the misconceptions held by students in this study included the belief that spinach is a better source of iron than meat, the belief that carbohydrates are higher in calories than protein or fat, and the belief that margarine is lower in caloric density than catsup.

Clearly, misconceptions about nutrition exist among the college population. Research (Chery et al., 1987; Mitchell, 1990) indicates that students possessing high levels of nutrition knowledge may still hold misconceptions about nutrition. It is important for educators to identify these misconceptions so that college curricula may be modified to better address them.

#### Effects of Knowledge, Beliefs, and Perceived Importance of Personal Diet on Behavior

Several other factors may influence dietary behavior including knowledge, nutrition related beliefs, and perceived importance of personal diet. According to the American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997), 79% of adult Americans believe nutrition is important to health, but only 39% say they are doing all they can to eat healthfully. Results from studies such as this indicate that nutrition related beliefs do not necessarily positively influence nutrition behavior. The following section will explore the available research on these subjects.

Several researchers (Schwartz, 1975; Melby et al., 1986; Barr, 1987; Shepherd & Stockley, 1987; Medeiros, Shipp & Taylor, 1993) have observed that knowledge does not necessarily improve one's dietary habits. In a study by Melby and associates (1986), 1226 students attending a large Midwestern university completed and returned mailed questionnaires assessing dietary and exercise related knowledge and beliefs. Forty-five percent of respondents agreed that a healthy diet would include eating fruits and vegetables each day, yet 69% of these students reported eating fruits less than once per day, and 43% reported eating vegetables less than once per day (Melby et al., 1986). Medeiros and associates (1993) also observed a lack of relationship between nutrition

knowledge and practices. According to Medeiros and associates, "Respondents appeared knowledgeable of nutrition principles, as reflected by their beliefs, but sound nutrition practices were not consistently demonstrated" (p. 202).

A relationship may or may not exist between nutrition knowledge and attitudes. Schwartz (1975) surveyed a random sample of 300 high school graduates from 476 different high schools via mailed questionnaires to observe the relationship between nutrition knowledge, attitudes and practices. Findings of the study supported a relationship between nutrition knowledge and attitudes, and between attitudes and behavior, but did not support a direct relationship between nutrition knowledge and practices. Shepherd and Stockley (1987) observed an even weaker correlation between nutrition knowledge and dietary behavior, in their study of nutrition knowledge, attitudes and fat consumption. They found that nutrition knowledge did not affect attitude or behavioral intention.

Several researchers (Vickery et al., 1985; Patterson et al., 1995) have linked perceived importance of healthful eating with actual dietary behaviors. Vickery and associates (1985) performed a study to determine whether an association existed between the expressed degree of dietary concern and various dietary practices among college women. A sample of 335 female college students enrolled in an introductory home economics course participated voluntarily in the study. All subjects kept two day food records and completed a survey to provide data on demographics, perceptions of body size, dietary adequacy, and the perceived value of the subject's own dietary practices. Results of the study indicated that compared to other female students surveyed, those who expressed much concern about their dietary practices were more likely to meet 100% of the RDAs, to use nutrient supplements as a safeguard against dietary deficiencies, and to rate their diets as good.

Similar results were found in a more recent study. Patterson and associates (1995) performed a study "to examine the prevalence of diet- and cancer-related psychosocial



constructs in a population-based sample and their association with healthful diets” (p. 86). A phone survey was performed as part of the Washington State Cancer Risk Behavior Survey, using a random digit dial survey among residents of Washington state. One thousand nine hundred sixty-seven participants, 18 years of age and older completed the survey. Patterson and associates observed that subjects who believed there was a link between diet and cancer consumed more fiber than those with no belief in a link between diet and cancer.

The relationship between knowledge, attitudes, beliefs and behavior is a complex one. According to the research addressed (Schwartz, 1975; Melby et al., 1986; Barr, 1987; Shepherd & Stockley, 1987; Medeiros et al., 1993), knowledge does not necessarily have a direct effect on dietary behavior. A relationship may exist between attitudes and dietary behavior, and between perceived importance of healthful eating and dietary behavior (Vickery et al., 1985; Patterson et al., 1995). Studies such as these indicate that attitudes and perceived importance of diet and nutrition may be important motivations to achieving healthful eating.

#### Students' Perceptions of Their Own Efforts to Achieve Healthful Eating

An accurate assessment of one's own dietary efforts must be performed before areas of needed improvement can be identified and the needed changes made. No literature could be found on the perceptions of college students' own individual efforts to achieve healthful eating styles. A limited amount of literature is available on college students' perceptions of the quality of their personal diets and will be addressed in the following section.

Vickery and associates (1985) addressed college students' perceptions of the quality of their personal diets asking participants to rate the adequacy of their daily intakes on a scale of 1 to 4 (1 = a poor intake to 4 = an excellent intake). Participants were categorized into four groups based on degree of concern over dietary habits. Categories included those exhibiting “much concern” about their dietary habits, those

exhibiting "some concern" about their dietary habits, those who were "confused" about dietary habits, and those exhibiting no concern about dietary habits. None of the participants rated their diets as excellent, 59.6% of participants in the "much concern" category rated their diets as good, 62.9% of participants in the "some concern" category rated their diets as fair, and 34.6% of the "confused" category rated their diets as poor. After analyzing students' actual intakes, Vickery and associates found that most students held inaccurate perceptions of their dietary habits, often overrating their adequacy. Several other researchers (Driskell et al., 1979; Mitchell, 1990) have also looked briefly at this issue, but have not addressed the accuracy of students' perceptions. Driskell and associates (1979) reported that most students studied classified their food habits as being "fair." Mitchell (1990) observed that basic nutrition students did not think their diets were very good at the beginning of the semester but perceived an improvement at the end of the semester.

Results of studies such as those by Vickery and associates (1985) indicate that college students may hold inaccurate perceptions of their own dietary habits, often overrating their adequacy. Inaccurate evaluation of one's own dietary habits may lead to a false sense of security, further impeding the adoption of healthful eating behaviors.

#### Physical Activity

Physical activity and exercise are also important factors in the prevention of some chronic diseases including heart disease and certain cancers. Perceived importance of regular physical activity, and perceptions of personal efforts to achieve regular physical activity may affect the development of activity habits. The American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997) explored adults' perceptions of the importance of physical activity and their perceived efforts to achieve regular physical activity. Results revealed that 81% of adults surveyed believe that exercise and physical activity are as important as a nutritious eating plan to good health, and 43% of Americans say they make an effort to get regular physical

activity. No literature could be found addressing college students' perceptions of the importance of regular physical activity or of perceptions of personal efforts to achieve regular physical activity. Some research has been performed addressing college students' knowledge about exercise, and exercise behavior of college students.

Several researchers (Miller et al., 1980; Melby et al., 1986; Schulz, 1988; Frost, 1992; Kelley, 1995; Pinto & Marcos, 1995; Haberman & Luffey, 1998) have addressed exercise knowledge and behavior of college students. Melby and associates (1986) found that only 24% of 1226 students surveyed reported participating in strenuous aerobic activity lasting for at least 30 minutes per session. Schulz (1988) found similar results. In a study of 333 college students, 116 students reported being sedentary. Forty-one percent of women reported being sedentary and 23% of men. Running was the most common mode of exercise for both men and women. Frost (1992) surveyed 1503 students from a four year liberal arts college and found only 33.5% exercised regularly. In more recent studies, Kelley (1995) found that the majority of African American college students surveyed were inactive with 71% of female students classified as very low active or low active and 49% of male students classified as very low active or active. Pinto and Marcus (1995) also found a large percentage of students surveyed to be sedentary with 46% of students surveyed ( $n = 217$ ) classified as inactive or were exercising irregularly and Haberman and Luffey (1998) found that only 39% of students surveyed ( $n = 301$ ) exercised three or more times a week. Twelve percent were not exercising at all.

This limited physical activity does not appear to be related to limited exercise knowledge. Melby and associates (1986) observed that college students appear to be knowledgeable about exercise. They did observe that exercise appeared to be positively related to nutrition behavior. Frost (1992) observed that 72% of students surveyed recognized the role of exercise in lowering the risk of cardiovascular disease. Miller and associates (1980) explored motivation for exercise among college students and found that 11% of students surveyed used exercise as a weight loss method. Further research needs

to be performed to examine college students motivations for physical activity and perceived barriers to achieving physical activity. Sedentary behavior can increase college students' risk of chronic disease and further research needs to be done to investigate methods to increase physical activity among college students to reduce this risk.

#### Differences in Dietary Behavior, Misconceptions, Barriers, and Physical Activity by Sex, and Residence

As discussed earlier, college students face unique challenges to achieving healthful eating and regular physical activity. The challenges are not the same for every student. Factors such as sex and residence can create their own unique challenges within the college population. The following section will discuss differences in dietary behavior, misconceptions and barriers in relation to nutrition and physical activity, between males and females and between residence hall students and non-residence hall students.

Differences between males and females. Males and females often behave differently, perceive things differently, and have different priorities. The issues of health and nutrition are no different. Several differences were observed between male and female adults in the American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997). Results revealed that women were more likely than men to say they are doing all they can to achieve a healthful diet and are more likely to believe they need supplements to ensure proper health. Men were more likely than women to make an effort to get regular physical activity.

Several researchers (Kahn, 1983; Herson, Skinner, Andrew & Penfield, 1986; Lieux & Manning, 1992; Huang et al., 1994; Haberman & Luffey, 1998) observed differences in dietary behavior between male and female college students. Kahn (1983) observed that male students had higher sodium intakes than did female students with men having high sodium intakes and women having sodium intakes on the high side of the normal range. Herson and associates (1986) observed that women consumed less milk

and alcoholic beverages than did men. Male students also tend to consume more fat according to studies by Lieux and Manning (1992) and Huang and associates (1994). Lieux and Manning observed that males tended to consume higher fat evening meals than did female students and Huang and associates observed that male students chose higher fat foods more often than did female students, and that women tended to eat whole wheat breads more often than did men. Haberman and Luffey (1998) also observed that women (61.3%) were more likely than men (41.7%) to limit fat intake. Many of these differences can be explained by the fact that women tend to eat fewer calories than do men.

Male and female college students also appear to behave differently in regards to physical activity. Schulz (1988) observed that female students studied were more sedentary than were male students. Forty-one percent of women studied were sedentary as opposed to only 23% of men. Melby and associates (1986) observed similar differences between college females and males. Kelley (1995) observed African-American female college students to be more sedentary than African-American male students with 71% of females surveyed classified as very low active or low active compared to 49% of males. Kennedy, Reis, Bane and Stang (1995) observed similar results among male and female college students. The results of a study by Haberman and Luffey (1998) do not appear to be consistent with these results. Haberman and Luffey found no significant difference between the physical activity levels of male and female college students.

Little literature is available on differences in misconceptions and barriers between males and females. McCarthy and Sabry observed in their 1973 study that male and female students had similar scores on misconception questionnaires indicating that males and females held similar misconceptions about food and nutrition. Barriers to healthful eating may be a slightly different story. Dittus and associates (1995) found that adult male subjects had higher mean scores measuring barriers to fruit and vegetable

consumption than did adult females, indicating that males perceive more barriers to fruit and vegetable consumption than do women.

Differences between on-campus residents and off-campus residents. Several studies (Melby et al., 1986; Beerman, Jennings & Crawford, 1990; Beerman, 1991; Brevard & Ricketts, 1996; Haberman and Luffey, 1998) have addressed differences in dietary intake, and physical activity among on-campus and off-campus residents. Brevard and Ricketts (1996) observed that off-campus students consumed a higher percentage of energy from protein. Serum lipid levels were similar for both groups of students, but off-campus students had higher triglyceride levels and higher ratios of total cholesterol to HDL. Melby (1986) observed that off-campus residents also consumed fruits and vegetables less frequently than on-campus residents. Haberman and Luffey (1998) observed that students living on-campus were more likely than students living off-campus to eat the same foods every day.

Beerman (1991) observed differences in intake according to differences in student residence, but not the differences observed by Melby (1986) and Brevard and Ricketts (1996). The results of Beerman's study indicated that on-campus and off-campus residents had similar diets, whereas Greek students had different nutrient intakes from non-Greek students. Greek residents had higher intakes of fat, cholesterol, saturated fat, sodium, and energy than both on-campus and off-campus residents. Beerman attributes this to the family style meal setting of Greek housing, and the unlimited number of portions available at these meals.

Physical activity does not appear to differ significantly according to students' housing arrangements. Melby (1986) observed that there were no differences in exercise between on-campus residents and off-campus residents. This concurs with results of a study by Brevard and Ricketts (1996) which indicated that 29% of students living on campus were sedentary, and 28% of students living off campus were sedentary. Haberman and Luffey also observed no differences in physical activity levels based on

residence. No literature was available on differences in misconceptions and barriers related to healthful eating and physical activity between on-campus and off-campus residents.

Each college student is an individual. Factors such as knowledge, misconceptions, barriers, perceived importance, and perceptions of personal efforts affect dietary behavior and physical activity. Factors such as sex and residence further affect dietary behavior and physical activity as previously discussed. Educators must take all of these factors into consideration when choosing methods to educate college students in matters of nutrition and physical activity.

This study attempted to explore these factors among the college students at Eastern Illinois University. Several areas were identified in previous discussion as needing further research including barriers and misconceptions to healthful eating among college students, perceived importance of healthful eating and physical activity, and perceptions of personal efforts to achieve healthful eating and physical activity. This study addressed these areas in an effort to better understand the challenges faced by college students in developing healthful eating and regular physical activity.

## Methodology

The purpose of this study was to explore Eastern Illinois University (EIU) students' (a) perceived barriers to achieving healthful eating, (b) misconceptions about nutrition, (c) perceptions of the importance of healthful eating and physical activity and (d) perceptions of their own efforts to achieve healthful eating and regular physical activity. The following methods were used to measure the objectives for this study.

### Sample

A convenience sample of 323 college students was used for this project. Students in seven sections of an introductory nutrition course titled Nutrition and Well-Being were surveyed during the first week of spring semester. It was assumed that multiple disciplines would be represented in this sample because this course is a general education course taken by students of many different majors. Only data from students aged 17-25 years were used for data analysis since this is the age group most representative of the general college population.

### Instrument

The American Dietetic Association (ADA) 1997 Nutrition Trends Survey (American Dietetic Association, 1997) questionnaire was adapted for use with a college population to focus on the specific objectives of this study (Appendix A). The survey was also adapted from the telephone survey format of the ADA Nutrition Trends Survey to a written format for use in a classroom setting. Demographic questions addressing living arrangements, meal preparation arrangements, grade level, age, and major were added. Several items were added regarding fast food choices and snack foods, and whether specific health conditions caused difficulty in achieving healthful eating. These items were constructed to fit the original format of the ADA Nutrition Trends Survey questions. Several questions that did not address the objectives of this study were deleted from the original survey and the formats of several questions were changed to better match the objectives of this study. All 48 final survey items address either a specific



objective or were included to help describe the sample (Appendix B). Items include Lickert scale questions, multiple choice questions, and yes/no questions.

The survey was examined by a nutrition panel of five graduate students and five graduate faculty to establish content validity. It was evaluated for congruence with objectives and for general format and clarity of items, and revised accordingly. In order to establish reliability, the survey instrument was pilot tested with a group of 11 students enrolled in a food preparation course at Eastern Illinois University. This course was chosen for the pilot test because of convenience and because these students were similar in age and grade level to students in the Nutrition and Well-Being course chosen for the sample.

#### Data Collection

The survey was administered to students in seven sections of the introductory nutrition course (Nutrition and Well-Being) during their regular class time the first week of classes of the 1998 spring semester. A researcher was present to provide instructions, answer questions, and to insure completeness of surveys. Students recorded all responses on a scantron sheet to facilitate data analysis. Participants did not record their names, social security numbers or any other personal identification information on the scantron sheets. Scantron sheets were later coded for data analysis, and all respondents remained anonymous.

#### Data Analysis

Data were analyzed using SPSS 7.5 for Windows. Frequency distributions and means (as appropriate) were calculated for all student responses. Students' t-tests, cross-tabulations and chi-square calculations were performed to identify differences in responses of male and female respondents, and of college students eating at least 61% of their meals in on-campus dining services (on-campus diners) and those who do not (off-campus diners).

## Results

### Sample

Questionnaires were administered to 323 students. Fourteen surveys were eliminated due to the participants' ages. Not all of the remaining 309 respondents completed all questions in accordance with survey instructions so data for questionnaire items are reported as frequency of usable responses. Female participants (217, or 71.1%) outnumbered male participants (88, or 28.9%). Of 308 participants, 57.5% (177) reported eating at least 61% of their meals in on-campus dining services. Students represented a variety of majors. One-fifth (20.5%, or 63) of participants were majoring in education/non-science concentrations, 19.2% (59) were majoring in family and consumer sciences/non-dietetics options (includes health studies majors), 17.5% (54) were majoring in either business, finance, economics, accounting, or math, and 8.1% (25) were majoring in either art, music, theater, speech, english or foreign language. Over half of students surveyed were freshman (57.5%), and 85.8% of students surveyed were between the ages of 18 and 20.

There were 9571 undergraduate students enrolled at Eastern Illinois University in the 1998 spring semester. Female students (5493, or 57.4%) outnumbered male students (4078, or 42.6%). One-fourth (24.9%, or 2278) of students were majoring in education/non-science concentrations, 5.8% (554) of students were majoring in family and consumer sciences/non-dietetics options (includes health studies majors), 19.5% (1870) of students were majoring in either business, finance, economics, accounting or math, and 14.6% of students were majoring in either art, music, theater, speech, english or foreign language. Thirty percent (2792) of students were between the ages of 18 and 19. Almost one-third (30.5%, or 3361) of students were seniors, 22.2% (2450) were juniors, 17.5% (1929) were sophomores, and 16.6% (1826) were freshman. The remaining results will be presented in order of the objectives as presented in the introduction.

### Perceived Barriers to Achieving Healthful Eating

Students were asked to rate several potential barrier statements as either a major reason, minor reason, or not a reason for them not doing more to achieve healthful eating. Response data for these items are presented in Table 1. The statement "I don't want to give up foods that I like" was cited most often as a reason with over 45.6% (141) of students indicating it was a major reason for them not doing more to achieve healthful eating. Other frequently cited major reasons included "It seems like I'm always hearing information about what not to eat, rather than what I should eat" (22.1%), "It takes too much time to keep track of my eating habits" (18.4%), "I am satisfied with the way I regulate my eating habits" (16.5%), and "There are so many new and conflicting studies that I don't know what's good for me anymore" (14.2%). Statements least frequently cited as major reasons for not doing more to achieve healthful eating included "Regulating eating habits is only important for people who have health risks" (1.9%), "It is difficult to find foods appropriate for my specially prescribed dietary needs" (6.9%), and "I don't know or don't understand the guidelines for diet and nutrition" (8.1%).

### Misconceptions Related to Diet and Nutrition

Several questionnaire items were related to misconceptions about diet and nutrition. Students were asked to rate their agreement with seven statements on a seven-point Likert scale (1 = strongly disagree to 7 = strongly agree). For purposes of data analysis, responses were collapsed into three general categories. Ratings of one and two were categorized as disagreement with a statement, ratings of three, four and five were categorized as moderate ratings, and ratings of six or seven were categorized as agreement with a statement. The uncollapsed data for the misconception statements plus mean responses and standard deviations are shown in Table 2.

Agreement with five of these statements could suggest that participants hold misconceptions. Nearly two-thirds (62.8%) of students surveyed agreed with the statement "Nutritionally speaking I believe there are good and bad foods"; 92 students

Table 1

## Perceived barriers to achieving healthful eating cited by Eastern Illinois University students

Barriers	Major Reason		Minor Reason		Not a Reason	
	n	%*	n	%*	n	%*
Lack of desire to give up favorite foods (n = 309)	141	45.6	104	33.7	64	20.7
Hearing what <u>not</u> to eat rather than what <u>should</u> be eaten (n = 307)	68	22.1	125	40.7	114	37.1
It takes too much time to keep track of eating habits (n = 309)	57	18.4	126	40.8	126	40.8
Satisfaction with current regulation of eating habits (n = 309)	51	16.5	120	38.8	138	44.7
New and conflicting studies (n = 309)	44	14.2	116	37.5	149	48.2
Confused by all of the reports that give dietary advice (n = 309)	39	12.6	110	35.6	160	51.8
Lack of healthy food alternatives available. (n = 309)	42	13.6	95	30.7	172	55.7
Don't know or understand the guidelines for diet and nutrition (n = 308)	25	8.1	70	22.7	213	69
Difficult to find foods for specially prescribed dietary needs (n = 306)	21	6.9	52	17.0	233	76.1
Regulating eating habits is only important for people who have health risks. (n = 309)	6	1.9	21	6.8	282	91.3

Note. Students were asked to rate several statements as either a major reason, minor reason or not a reason for them not doing more to achieve healthful eating (See Appendix A).

\*Percentages may not total 100.0 due to rounding.

Table 2

## Eastern Illinois University students' agreement with misconception statements

Statement	Agreement Scale						
	Strongly disagree			Strongly agree			
	1	2	3	4	5	6	7
	n(%)*	n(%)*	n(%)*	n(%)*	n(%)*	n(%)*	n(%)*
Nutritionally speaking, I believe there are good and bad foods. <sup>a</sup> (mean = 5.57 +/- 1.65, n = 304)	12 (3.9)	9 (3.0)	15 (4.9)	36 (11.8)	41 (13.5)	69 (22.7)	122 (40.1)
Taking vitamin supplements is necessary to ensure good health. <sup>a</sup> (mean = 3.62 +/- 1.64, n = 292)	32 (11.0)	51 (17.5)	47 (16.1)	85 (29.1)	37 (12.7)	22 (7.5)	18 (6.2)
Body weight is a good indicator of a healthy diet. <sup>a</sup> (mean = 3.38 +/- 1.68, n = 293)	54 (18.4)	49 (16.7)	41 (14.0)	71 (24.2)	45 (15.4)	25 (8.5)	8 (2.7)
Based on the information I've heard, I believe there are some foods I should never eat. <sup>a</sup> (mean = 3.29 +/- 1.88, n = 292)	61 (20.9)	59 (20.2)	49 (16.8)	52 (17.8)	27 (9.2)	17 (5.8)	27 (9.2)

Note. Students' responses were given on a 7-point Likert scale based on their agreement with misconception statements. A response of one indicates strong disagreement with a statement and a response of 7 indicates strong agreement with a statement. <sup>a</sup>Agreement with statement suggests a misconception. <sup>b</sup>Disagreement with statement suggests a misconception.

\*Percentages may not total 100.0 due to rounding.

Table 2 (continued)

## Eastern Illinois University students' agreement with misconception statements

Statement	Agreement Scale						
	Strongly disagree					Strongly agree	
	1	2	3	4	5	6	7
	n (%) <sup>*</sup>	n (%) <sup>*</sup>	n (%) <sup>*</sup>	n (%) <sup>*</sup>	n (%) <sup>*</sup>	n (%) <sup>*</sup>	n (%) <sup>*</sup>
It is important to monitor total calories from all foods in one's diet. <sup>b</sup> (mean = 4.10 +/- 1.66, n = 293)	17 (5.8)	33 (11.3)	60 (20.5)	72 (24.6)	50 (17.1)	28 (9.6)	33 (11.3)
It is important to completely eliminate fat from one's diet. <sup>a</sup> (mean = 1.70 +/- 1.14, n = 292)	183 (62.7)	55 (18.8)	28 (9.6)	17 (5.8)	5 (1.7)	2 (0.7)	2 (0.7)
Overall health depends on both physical activity and a healthy diet. <sup>b</sup> (mean = 6.39 +/- 1.07, n = 303)	3 (1.0)	1 (0.3)	3 (1.0)	12 (4.0)	29 (9.6)	55 (18.2)	200 (66.0)

Note. Students' responses were given on a 7-point Likert scale based on their agreement with misconception statements. A response of one indicates strong disagreement with a statement and a response of 7 indicates strong agreement with a statement.<sup>a</sup> Agreement with statement suggests a misconception. <sup>b</sup> Disagreement with statement suggests a misconception.

\*Percentages may not total 100.0 due to rounding.

(30.2%) responded with moderate ratings and 21 students (6.9%) disagreed with the statement. Agreement with the statement “Body weight is a good indicator of a healthy diet” could also suggest a misconception. Thirty-three students (11.2%) agreed with this statement, about half (53.6%) responded with moderate ratings, and about one-third (35.1%) disagreed with the statement. Agreement with the statement “Taking vitamin supplements is necessary to ensure good health” could also suggest a misconception. Forty students (13.7%) agreed with the statement, 169 students (57.9%) responded with moderate ratings, and 83 students (28.5%) disagreed with this statement. Agreement with the statement “Based on the information I’ve heard, I believe that there are some foods I should never eat” could also suggest a misconception. Forty-four (15.0%) students agreed with this statement, 128 students (43.8%) responded with moderate ratings, and 120 students (41.1%) disagreed with this statement. Only four students (1.4%) agreed with the statement “It is important to completely eliminate fat from one’s diet,” 50 students (17.1%) were responded with moderate ratings, and 238 (81.5%) disagreed.

Disagreement with two of the statements also could suggest that participants hold misconceptions. Fifty students (17.1%) disagreed with the statement “It is important to monitor total calories from all foods in one’s diet,” 182 students (62.2%) responded with moderate ratings, and 61 students (20.9%) agreed. Disagreement with the statement “Overall health depends on both physical activity and a healthy diet” could also suggest a misconception. Four students (1.3%) disagreed with the statement, forty-four students (14.6%) responded with moderate ratings, and 255 students (84.2%) agreed with the statement.

Students also were asked to choose which of two statements relating to fat intake they agreed with more. The first statement was “I can include any food in my diet as long as I watch my overall fat intake” and the second statement was “It is important to be sure that just about every food item I eat is low in fat.” Agreement with the second statement

could suggest a misconception. Two hundred thirty-eight students (77.5%) chose the first statement and only 68 students (22.5%) chose the second statement.

Students also were asked to indicate their perceptions of the effects of intakes of various types of foods on overall health. Students were asked to rate each type of food as very unhealthy, somewhat unhealthy, no effect, somewhat healthy and very healthy. Response data for these items are presented in Table 3. In general most students rated fruits and vegetables (97.4%), grain foods (95.4%), poultry (85.0%), dairy products (80.3%), fish and seafood (76.1%) and dried beans (70%) as healthy or very healthy. Snack foods (93.5%), sweets (91.5%), fast foods (91.9%) and fats (88.8%) were rated unhealthy or very unhealthy by most students. Eggs were rated as healthy by nearly half (41.9%), unhealthy by 34%, and "no effect" by 24.1%. Meats also received mixed responses with half (50%) rating this group as healthy, 37.2% as unhealthy, and 12.7% "no effect." Response data for these items are presented in Table 3.

#### Perceived Importance of Healthful Eating and Regular Physical Activity

For two questionnaire items college students were asked to rate the importance of healthful eating and physical activity using a seven-point Likert scale (1 = not at all important to 7 = very important). Ratings of one or two were categorized as "unimportant" rating, three, four and five as moderate ratings, and six or seven as "important" ratings. For the statement "Overall, how **important** is healthful eating to you personally?" the mean response was 4.91 (standard deviation 1.46). Frequency distribution revealed that 7.5% (23) of participants responded with "unimportant" ratings, 54.7% (168) responded with a moderate rating, and 37.8% (116) of participants responded with "important" ratings. The mean rating of the statement "Overall, how **important** are exercise and physical activity to you personally?" was 5.28 (standard deviation 1.40). Frequency distribution revealed that 3.0% (9) of participants responded with "unimportant" ratings, 49.2% (151) responded with a moderate rating, and 47.9%



Table 3

Eastern Illinois University students' responses to items addressing perceived health effects of various foods

	Very unhealthy		Somewhat unhealthy		No effect		Somewhat healthy		Very healthy	
	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)	n (%)
Fruits and vegetables (mean = 4.84 +/- 0.55, n = 306)	3 (1.0)	1 (0.3)	4 (1.3)	9 (3.0)	4 (1.3)	26 (8.5)	272 (88.9)			
Grain foods (mean = 4.49 +/- 0.67, n = 305)	2 (0.7)	3 (1.0)	9 (3.0)	31 (10.1)	9 (3.0)	120 (39.3)	171 (56.1)			
Poultry (mean = 4.08 +/- 0.81, n = 306)	4 (1.3)	11 (3.6)	31 (10.1)	171 (55.9)	31 (10.1)	144 (47.4)	100 (32.9)			
Dairy products (mean = 3.98 +/- 1.02, n = 304)	8 (2.6)	30 (9.9)	22 (7.2)	142 (46.4)	22 (7.2)	112 (36.8)	101 (33.2)			
Fish and seafood (mean = 3.98 +/- 0.90, n = 306)	6 (2.0)	11 (3.6)	56 (18.3)	142 (46.4)	56 (18.3)	112 (36.8)	101 (33.2)			
Dried beans (mean = 3.94 +/- 0.98, n = 304)	9 (3.0)	9 (3.0)	73 (24.0)	112 (36.8)	73 (24.0)	112 (36.8)	101 (33.2)			

Note. Students were asked to indicate the impact he/she felt each food group has on overall health.

Table 3 (continued)

Eastern Illinois University students' responses to items addressing perceived health effects of various foods

	Very unhealthy n (%)	Somewhat unhealthy n (%)	No effect n (%)	Somewhat healthy n (%)	Very healthy n (%)
Meat (mean = 3.11 +/- 1.13, n = 306)	23 (7.5)	91 (29.7)	39 (12.7)	135 (44.1)	18 (5.9)
Eggs (mean = 3.10 +/- 1.02, n = 303)	12 (4.0)	91 (30.0)	73 (24.1)	110 (36.3)	17 (5.6)
Fats such as oil and butter (mean = 1.68 + or - 0.87, n = 294)	147 (50.0)	114 (38.8)	15 (5.1)	15 (5.1)	3 (1.0)
Sweets (mean = 1.55 + or - 0.73, n = 294)	165 (56.1)	104 (35.4)	18 (6.1)	6 (2.0)	1 (0.3)
Fast foods (mean = 1.46 + or - 0.79, n = 294)	196 (66.7)	74 (25.2)	15 (5.1)	5 (1.7)	4 (1.4)
Snack foods (mean = 1.41 + or - 0.71, n = 294)	200 (68.0)	75 (25.5)	12 (4.1)	5 (1.7)	2 (0.7)

Note. Students were asked to indicate the impact he/she felt each food group has on overall health.

(147) responded with "important" ratings. Uncollapsed data for both items are listed in Table 4.

#### Perceived Efforts Related to Achieving Healthful Eating and Regular Physical Activity

Several questionnaire items addressed students perceived efforts to achieve healthful eating and regular physical activity. Students were asked to respond to the statement "To what extent would you say that you **carefully** select what you eat to achieve a healthy diet?" using a seven-point Likert scale (1 = not at all careful to 7 = very careful). Ratings of one, two or three were categorized as "not careful" ratings, four as neutral, and five, six or seven as "careful" ratings. The mean rating was 4.07 (standard deviation 1.49) and frequency distribution revealed that 42.2% (129) responded with "careful" ratings, 32.4% (99) responded with "not careful" ratings and 25.5% (78) responded with neutral ratings. Uncollapsed data for this item are listed in Table 5.

Participants were also asked to respond to the statement "To what extent would you say that you make a conscious effort to regularly get exercise and physical activity" using a seven-point Likert scale (1 = little or no effort to 7 = very conscious effort). Ratings of one, two, or three were categorized as "little effort" ratings, four as neutral, and five, six or seven as "conscious effort" ratings. The mean response was 4.59 (standard deviation 1.68) and frequency distribution revealed that 51.6% (158) of students responded with "conscious effort" ratings, 27.4% (84) responded with "little effort" ratings, and 20.9% (64) responded with neutral ratings. Uncollapsed data are listed in Table 5.

Students also were asked to rate their past, present and anticipated future efforts to achieve good nutrition and a healthy diet. When asked "Do you feel you are currently doing **all you can** to achieve good nutrition and a healthy diet?" the majority (86.4%) of students (260) responded "no." When asked "Compared to before you started college, would you say you are doing more, less, or about the same to achieve good nutrition and a healthy diet?" one-third (33.3%, or 103) reported they were doing more to achieve good

Table 4

Eastern Illinois University students' responses to items addressing perceived importance of healthful eating and regular physical activity

<u>Survey Item</u>	<u>Rating Scale</u>						
	<u>Not at all important</u>					<u>Very important</u>	
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>
	<u>n (%)</u>	<u>n (%)</u>	<u>n (%)</u>	<u>n (%)</u>	<u>n (%)</u>	<u>n (%)</u>	<u>n (%)</u>
Overall, how important is healthful eating to you personally? (n = 307)	6 (2.0)	17 (5.5)	26 (8.5)	59 (19.2)	83 (27.0)	75 (24.4)	41 (13.4)
Overall, how important are exercise and physical activity to you personally? (n = 307)	2 (.70)	7 (2.3)	26 (8.5)	55 (17.9)	70 (22.8)	72 (23.5)	75 (24.4)

Note. Students' responses were given on a 7 point Likert scale based on their perceived importance of healthful eating and physical activity.

Table 5

Eastern Illinois University students' perceived efforts to achieve a healthy diet and regular physical activity

Survey Item	Rating Scale						
	1 n (%)	2 n (%)	3 n (%)	4 n (%)	5 n (%)	6 n (%)	7 n (%)
To what extent would you say that you carefully select what you eat to achieve a healthy diet? <sup>a</sup> (n = 306)	15 (4.9)	39 (12.7)	45 (14.7)	78 (25.5)	82 (26.8)	33 (10.8)	14 (4.6)
To what extent would you say that you make a conscious effort to regularly get exercise and physical activity? <sup>b</sup> (n = 306)	11 (3.6)	24 (7.8)	49 (16.0)	64 (20.9)	57 (18.6)	49 (16.0)	52 (17.0)

<sup>a</sup>Students responded on a 7-point Likert scale with 1 = not at all careful to 7 = very careful. <sup>b</sup>Students responded on a 7-point Likert scale with 1 = little or no effort to 7 = conscious effort.

nutrition than before college, one-third (33.7%, or 104) reported doing less than before college, and one-third (33.0%, or 102) reported doing the same as before college to achieve good nutrition and healthful eating. When asked "Do you anticipate doing more, less, or about the same to achieve good nutrition and a healthy diet after you leave college and later on in your life?" more than two-thirds (69.6%, or 215) reported they anticipated doing more to achieve good nutrition and a healthy diet after college, slightly more than one-fourth (27.8%, or 86) reported they anticipated doing the same, and only a few students (2.6%, or 8) reported they anticipated doing less. Students also were asked to rate their personal efforts to seek nutrition information. Only 6.8% of students (21) reported very actively seeking nutrition information, 15.9% (49) responded quite actively, about one-third of students (32.1%, or 99) responded somewhat actively, and about one-third (34.7%, or 107) responded with seldom. Thirty-two students (10.4%) reported they do not seek nutrition information.

#### Differences in Responses Between Male and Female Students

Perceived barriers to achieving healthful eating. Chi-square tests indicated some significant differences in responses between male and female students for two questionnaire items related to perceived barriers to achieving healthful eating (Table 6). Females appeared to be more likely than males to indicate a lack of desire to give up foods they like as a reason for not doing more to achieve healthful eating. Males appeared to be more likely than females to cite "Regulating eating habits is only important for people who have health risks" as a reason for not doing more to achieve healthful eating. There were no other significant differences observed between responses of males and females to the perceived barriers to achieving healthful eating items.

Misconceptions related to diet and nutrition. Several significant differences also were observed in responses of males and females to misconception items (Table 7). Comparison of mean ratings indicated that female students agreed slightly more than did males with the statements "Taking vitamin supplements is necessary to ensure good

Table 6

Significant differences in responses of male and female Eastern Illinois University students to barrier statements

Barrier Statement	Major Reason		Minor Reason		Not a Reason		Total		Significance*
	M n(%)	F n(%)	M n(%)	F n(%)	M n(%)	F n(%)	M n(%)	F n(%)	
I don't want to give up foods that I like.	41 (46.6)	98 (45.2)	22 (25.0)	81 (37.3)	25 (28.4)	38 (17.5)	88 (100.0)	217 (100.0)	p < .040
Regulating eating habits is only important for people who have health risks.	3 (3.4)	3 (1.4)	11 (12.5)	10 (4.6)	74 (84.1)	204 (94.0)	88 (100.0)	217 (100.0)	p < .022

Note. Students were asked to respond with the choice that best represented to what degree each statement was a reason for them not doing more to achieve healthful eating; n = 88 males, 217 females.

\*Determined by chi-square analysis.

Table 7

## Significant differences in responses of male and female Eastern Illinois University students to misconception statements

Misconception Statement	Males		Females		Mean Difference	Significance (2-tailed)*
	Means	Std. Deviation	Means	Std. deviation		
Taking vitamin supplements is necessary to ensure good health. <sup>a</sup> (n = 81 males, 207 females)	3.21	1.60	3.80	1.62	.59	.006
It is important to monitor total calories from all foods in one's diet. <sup>b</sup> (n = 82 males, 207 females)	3.74	1.69	4.22	1.63	.48	.030
I should never eat some foods. <sup>a</sup> (n = 82 males, 206 females)	2.91	1.87	3.42	1.84	.50	.040

Note. Students' responses were given on a 7-point Likert scale based on their agreement with misconception statements (1 = strong disagreement to 7 = strong agreement). <sup>a</sup>Agreement with statement indicates a misconception. <sup>b</sup>Disagreement with statement indicates a misconception. \*Determined by Students t-test analysis.



health,” “It is important to monitor total calories from all foods in one’s diet,” and “I should never eat some foods.” Chi-square analysis indicated a significant difference in responses of males and females to an item related to fat intake ( $p < .034$ ). About one-fourth (26.0%, or 56) of females (215) believed that every food eaten should be low in fat compared to 14.8% (13) of males (88).

Chi-square tests indicated a significant difference in responses between males and females to items related to the health effects of sweets and fast foods (Table 8). Students were asked to indicate their perceptions of the effects of intakes of various types of foods on overall health. Students rated each type of food as very unhealthy, somewhat unhealthy, no effect, somewhat healthy or very healthy. Compared with males, female students rated fast foods such as Pizza Hut pizza and McDonald’s hamburgers as more unhealthy than did males. Females also appeared to rate sweets as being more unhealthy.

Perceived importance and perceived efforts related to healthful eating and physical activity. Several differences in responses between males and females also were observed for items related to the importance of healthful eating and perceived efforts to achieve healthful eating and regular activity. Students were asked to rate the importance of healthful eating on a seven-point Likert scale with a response of one indicating not at all important and a response of seven indicating very important. The mean rating of female students (5.07 +/- 1.31) was significantly higher ( $p < .006$ ) than that of males (4.51 +/- 1.71). Students were asked to rate how carefully they selected their food on a seven-point Likert scale, with a response of one indicating not at all careful and a response of seven indicating very carefully. The mean rating for females (4.22 +/- 1.47) for this item was significantly higher ( $p < .006$ ) than that for males (3.70 +/- 1.48).

Chi-square tests indicated a significant difference in distributions of responses between male and females students to items related to seeking nutrition information ( $p < .004$ ). Females appeared to rate themselves as more active seekers of nutrition information than did male students. Sixteen female students (17.4%) rated themselves as

Table 8

Differences in male and female Eastern Illinois University students' responses related to health effects of various foods

Food	Very unhealthy		Somewhat unhealthy		No effect		Somewhat healthy		Very healthy		Total	Significance*	
	M n(%)	F n(%)	M n(%)	F n(%)	M n(%)	F n(%)	M n(%)	F n(%)	M n(%)	F n(%)			
Fast foods	42 (51.2)	152 (72.4)	28 (34.1)	46 (21.9)	6 (7.3)	9 (4.3)	4 (4.9)	1 (0.5)	2 (2.4)	2 (1.0)	82 (99.9)**	210 (100.1)**	p < .003
Sweets	37 (45.1)	126 (60.0)	31 (37.8)	73 (34.8)	9 (11.0)	9 (4.3)	4 (4.9)	2 (1.0)	1 (1.2)	0 (0.0)	82 (100.0)	210 (100.1)**	p < .008

Note. Students were asked to indicate the impact he/she feels each food group has on overall health.

\*Determined by chi-square analysis.

\*\*Percentages do not total 100.0 due to rounding.

very actively seeking information and 18.4% (40) rated themselves as quite actively seeking information. Only 5.7% (5) of male students (88) rated themselves as very actively seeking information and only 9.1% (8) rated themselves as quite actively seeking information.

Students were also asked to rate their perceptions of their efforts to achieve regular physical activity on a seven point Likert scale (1 = little or no effort to 7 = conscious effort). Chi-square tests indicated a significant difference in responses between male and female students ( $p < .017$ ). Males appeared to rate themselves as exerting more effort to achieve regular physical activity than did females. Twenty-three males (26.4%) responded with ratings of seven versus 28 females (13.0%), and 20.7% (18) rated their efforts with a six versus 14.4% (31) of females.

#### Differences in Responses Between On-campus and Off-campus Diners

Perceived barriers to achieving healthful eating. Chi-square tests indicated a difference in distributions of responses of students eating at least 61% of their meals in on-campus dining services (on-campus diners) and those who do not (off-campus diners) for the item identifying a lack of healthy food alternatives as a barrier to not doing more to achieving healthful eating ( $p < .011$ ). Only 50.3% (89) of on-campus diners (177) reported this was not a reason versus 63.4% (83) of off-campus diners (131). Slightly more off-campus than on-campus diners ( $p < .033$ ) cited "Regulating eating habits is only important for people who have health risks" as a reason for not doing more to achieve healthful eating. Only 88.5% (116) of off-campus diners (131) cited this as a reason for not doing more to achieving healthful eating versus 93.2% (165) of on-campus diners (177). A summary of response data is shown in Table 9.

Misconceptions related to diet and nutrition. Differences in responses between on-campus diners and off-campus diners also were observed for two items related to misconceptions associated with diet and nutrition. The mean response of off-campus diners (6.54 +/- 0.95) was significantly higher ( $p < .046$ ) than that of on-campus diners

Table 9

Significant differences in responses of college students who eat the majority of their meals in on campus dining services and those who do not to barrier statements\*

Barrier Statement	Major Reason		Minor Reason		Not a Reason		Total		Significance*
	On Campus n (%)	Off Campus n (%)	On Campus n (%)	Off Campus n (%)	On Campus n (%)	Off Campus n (%)	On Campus n (%)	Off Campus n (%)	
There aren't enough healthy food alternatives available.	22 (12.40)	20 (15.3)	66 (37.3)	28 (21.4)	89 (50.3)	83 (63.4)	177 (100.0)	131 (100.1)**	p < .011
Regulating eating habits is only important for people who have health risks.	5 (2.8)	1 (.08)	7 (4.0)	14 (10.7)	165 (93.2)	116 (88.5)	177 (100.0)	131 (100.0)	p < .033

Note. Students were asked to respond with the choice that best represented to what degree each statement was a reason for them not doing more to achieve healthful eating. Students who reported that they ate at least 61% of their meals in on-campus dining services were considered to eat a majority of their meals in on-campus dining services.

\*Determined by chi-square analysis.

\*\*Percentages do not total 100.0 due to rounding

(6.29 +/- 1.14) for the statement "Overall health depends on both physical activity and a healthy diet," indicating somewhat greater disagreement for off-campus diners. For the item "It is important to completely eliminate fat from one's diet" the mean rating for off-campus diners (1.86 +/- 1.33) was significantly higher ( $p < .036$ ) than that of on-campus diners (1.58 +/- .96) indicating somewhat greater agreement for on-campus diners.

Perceived efforts to achieve healthful eating and efforts to seek nutrition information. Differences in responses between on-campus and off-campus diners were also observed for an item related to perceived efforts to achieve healthful ( $p < .035$ ). Students were asked whether they planned on doing more, less, or about the same to achieve healthful eating after college. A slightly higher percentage of off-campus diners anticipated doing more to achieve healthful eating after college than did on-campus diners. Seventy-four percent (97) of off-campus diners (131) said they planned on doing more to achieve healthful eating compared to 67% (118) of on-campus diners (177). Eight on-campus diners (4.5%) anticipated doing less to achieve healthful eating after college and 28.8% (51) anticipated exerting the same effort after college to achieve healthful eating. No off-campus diners anticipated doing less to achieve healthful eating after college, and 26.0% (34) of off-campus diners anticipated exerting the same effort after college to achieve healthful eating.

Chi-square tests also indicated a significant difference in responses between on-campus and off-campus diners to an item related to perceived efforts to seek nutrition information ( $p < .049$ ). Off-campus diners (130) were more likely to rate themselves as active seekers of nutrition information with 9.2% (12) rating themselves as very actively seeking nutrition information, 18.5% (24) as quite actively seeking nutrition information, and 35.4% (46) as somewhat actively. Only 5.1% (9) of on-campus diners (177) rated themselves as very actively seeking nutrition information, 14.1% (25) as quite actively seeking nutrition information, and 29.9% (53) as somewhat actively seeking nutrition

information. One-third (31.5%, or 41) of off-campus diners rated themselves as seldom seeking nutrition information and 5.4% (7) of off-campus diners said they did not seek nutrition information compared to 36.7% (65) of on-campus diners and 14.1% (25) of on-campus diners respectively. No other significant differences in responses were observed between on-campus and off-campus diners.

## Discussion

The purpose of this study was to explore Eastern Illinois University (EIU) students' (a) perceived barriers to achieving healthful eating, (b) misconceptions about nutrition, (c) perceptions of the importance of healthful eating and physical activity and (d) perceptions of the importance of healthful eating and physical activity.

### Sample

The sample consisted of 309 Eastern Illinois University (EIU) undergraduate students. Over 70% (71.1%) of students surveyed were females (217) and only 28.9% of participants were males (88) participants. This is slightly misrepresentative of the EIU population as a whole. Only 57.4% of students (9157) attending EIU in the spring of 1998 were females (5493) and 42.6% of students were males (4078). A variety of majors were represented in this study. One-fifth (20.5%, or 63) of participants were majoring in education/non-science concentrations, 19.2% (59) were majoring in family and consumer sciences/non-dietetics options (includes health studies majors), and 17.5% (54) were majoring in either business, finance, economics, accounting, or math. This is fairly representative of the EIU population as a whole. One-fourth (24.9%, or 2278) of students attending EIU were majoring in education/non-science concentrations, 5.8% (554) of students were majoring in family and consumer sciences/non-dietetics options (includes health studies), 19.5% (1870) of students were majoring in either business, finance, economics, accounting or math, 14.6% (1337) of students were majoring in either art, music, theater, speech, English or foreign language, and 8.1% (25) were majoring in either art, music, theater, speech, English or foreign language. The sample contained a slightly larger proportion of family and consumer sciences/non-dietetics options (includes health studies) than did the EIU population as a whole. However, this larger proportion of family and consumer sciences majors would be representative of a typical Nutrition and Well-Being course since this is a course required for most family and consumer science majors.

Ages and classifications represented by the sample are slightly misrepresentative of the EIU population as a whole, but not necessarily misrepresentative of a typical introductory nutrition course. Over half of students surveyed were freshman (57.5%), and 67.6% (209) of students surveyed were between the ages of 18 and 19 whereas only 16.6% (1826) of EIU students were freshman and only 30.5% of EIU students were between the ages of 18 and 19. A general education course such as Nutrition and Well-Being would be expected to have a slightly larger proportion of younger students compared to the EIU population as a whole. Since this study is seeking information that could be used to improve courses such as Nutrition and Well-Being, the ages and classifications represented in this sample are satisfactory for comparison purposes. The remaining results will be presented in order of the objectives as presented in the introduction.

#### Perceived Barriers to Achieving Healthful Eating

Responses to the potential barrier statements on the questionnaire indicate that EIU students surveyed may perceive several factors to be barriers to achieving healthful eating. Fear of giving up favorite foods appears to be the greatest concern for these EIU students. Over three-fourths of students surveyed identified "I don't want to give up foods that I like" as a reason for not doing more to achieve healthful eating. This was the most common reason cited, and 45.6% indicated it was a major reason. The third most often cited reason by these students for not doing more to achieve healthful eating was "It takes too much time to keep track of my eating habits" with 18.4% citing this as a major reason. Koszewski and Kuo (1996) reported that adequate time to eat influenced the nutritional adequacy of diets of college women, and Range (1996) reported that negative attitudes associated with preparation time may act as a barrier to college students' fruit and vegetable intake, indicating that issues of time may also affect the quality of students' intakes.



The results of this study indicate that many EIU students perceive achieving healthful eating as a chore that requires abstaining from favorite foods, and time-consuming methods of tracking eating habits. Educators may need to address this perception by showing students practical ways to eat healthy while including their favorite foods. Showing students examples of healthy daily intakes that include servings of their favorite foods may help students recognize that they need not deprive themselves of certain foods to achieve healthful eating. Educators may need to approach students' concerns about time by showing students how to achieve healthful eating without time consuming evaluation of their intakes. For example, educators may instruct students to consume 20-35 grams of fiber a day which could cause students to feel frustration over time required to track their actual fiber intake. Instead, educators could instruct students to eat five fruits and vegetables a day and to eat whole grain foods instead of highly processed grain foods whenever possible. These more general guidelines would help students achieve the needed fiber in their diets without feeling pressured to keep track of specific fiber intakes. Educators may also need to show students practical, quick and easy ways to follow guidelines to address concerns about time available to eat and prepare food addressed by other researchers (Koszewski & Kuo, 1996; Range, 1996). Some examples might include showing students easy ways to incorporate fruits and vegetables into their favorite dishes, how to choose healthful foods when dining out and healthful "snacking on the run" ideas. Such practical suggestions might show students that healthful eating can realistically be achieved in the midst of their hectic schedules.

The second most cited reason for not doing more to achieve healthful eating by these students was "It seems like I'm always hearing information about what not to eat, rather than what I should eat" (21.1%). This may imply that nutrition educators should shift their focus to a more positive approach. Although professionals have revised the Dietary Guidelines for Americans (United States Department of Agriculture, 1995) to use more positive language, nutrition guidelines are often presented in a negative light in the

media and in certain forms of education. Suggestions such as "Decrease consumption of high fat foods" and "Decrease consumption of foods high in sodium" can easily be perceived as a list of "Do not's." Students appear ready for more positive guidance. For nutrition educators, this may mean the need for a more positive "user friendly" approach to nutrition guidelines. Instead of suggestions such as "Decrease fat intake," suggestions such as "Make a majority of food choices from foods that contain 30% of total calories from fat or less" and "Eat more plant based foods" could be made. Positive suggestions should be accompanied by specific examples relevant to students and their lifestyles. Such an approach may encourage students to take positive action towards achieving healthful eating, and help students feel more as if they have a say in their food choices instead of feeling governed by a set of restrictive rules.

The fourth most cited reason by students for not doing more to achieve healthful eating was "I'm satisfied with the way I regulate my eating habits" with 16.5% of students citing this as a major reason. This could possibly be due to students' apathetic attitude towards the importance of healthful eating for good health which will be discussed later. Students may not perceive healthful eating to be important, and as a result see no reason to increase their efforts to achieve healthful eating.

The fifth most cited reason by students as a barrier to achieve healthful eating was "There are so many new and conflicting studies I don't know what's good for me anymore," with 14.2% citing this as a major reason. This suggests that these students are confused by continually changing research related to nutrition. Educators may need to help students understand the continually evolving nature of nutrition science, and how they should interpret single bits of new information from research into the context of the whole body of available nutrition information. Also, educators may need to help students understand the media's portrayal of nutrition information. Results of new research that differ from existing research are deemed newsworthy by the media and may be reported before results can be confirmed or denied by further research. This type of reporting can

sometimes imply more change in nutrition information than is actually occurring. Educators need to help students recognize that headlines and news reports may overemphasize the results of new studies in relation to existing research and that these reported results may not mean that their previous knowledge about nutrition is invalid.

Perceived barriers of students surveyed are similar to those reported for the adult population. "I don't want to give up foods that I like" also was the top perceived barrier to achieving healthful eating reported for adults 25 and older in the American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997). Forty percent of the adults surveyed identified this as a major reason. Similarly, Lloyd and associates (1995) found perceived reduction in taste to be a barrier to reducing fat intake among adults in the UK population. Twenty-one percent of adults surveyed in the American Dietetic Association 1997 Nutrition Trends Survey indicated "It takes too much time to keep track of my eating habits" as a major reason for not doing more to achieve healthful eating. These results indicate that adults may also perceive healthful eating to be a time consuming chore with less satisfying results.

Another perception of the general adult population similar to EIU students surveyed is "It seems like I'm always hearing information about what not to eat rather than what I should eat" with 23% of adults surveyed citing this as a major reason for not doing more to achieve healthful eating (American Dietetic Association, 1997). This suggests that both groups might be more receptive to a more positive approach to nutrition education. "There are so many new and conflicting studies I don't know what's good for me any more" was also in the top five reasons cited for not doing more to achieve healthful eating by both adults and college students surveyed suggesting that both adults and students need assistance in interpreting the meaning of new research in relationship to existing nutrition information. Although "I'm satisfied with the way I regulate my eating habits" was also among the top five reasons identified for not doing more to achieve healthful eating for both adults and college students surveyed, only

16.5% of the college students surveyed cited this as a major reason compared to 39% of the adults. This difference could be at least partially explained by differences in perceived efforts to achieve healthful eating to be discussed later.

The similarity of these results may indicate that several of these barriers may not be age or lifestyle specific. College students do face unique challenges to developing their own lifestyles in a university setting. Although these results indicate that college students have similar perceptions to the adult population as a whole regarding barriers to achieving healthful eating, education still needs to be individualized to the specific challenges presented by both lifestyles.

#### Misconceptions Related to Diet and Nutrition

Students' agreement with several misconception statements could indicate that they hold misconceptions related to diet and nutrition. The majority of students surveyed (62.8%) responded with agreement to the statement "Nutritionally speaking, I believe there are good and bad foods." A few students (15%) also agreed with the statement "Based on the information I've heard, I believe there are some foods I should never eat" also suggesting a belief that some foods are "bad." An overwhelming majority of students surveyed also rated sweets, fast foods and snack foods as "very unhealthy" indicating these foods are potentially "bad" foods. Studies (Driskell et al., 1979; Melby et al., 1986; Hertzler & Frary, 1989, Huang et al., 1994) have indicated that favorite snack foods among college students include popcorn, potato chips, candybars and cookies. All of these foods could potentially be perceived by students as unhealthy and therefore labeled as "bad" foods (according to results of this study). It is possible that students with these beliefs would feel they should attempt to severely restrict or completely eliminate their favorite "bad" foods. Results indicate that a top perceived barrier among students surveyed is "I don't want to give up foods that I like" indicating they are not willing to do this. Educators may need to show students that foods in and of themselves should be judged neither "bad" nor "good," but that the quality of the students' eating habits as a

whole should be evaluated. Showing students how their favorite "junk" foods can be included in moderation in a healthy diet may help students perceive healthful eating as realistic and may change students' perceptions that they must severely restrict or avoid favorite foods.

Considerably fewer students agreed with the statements "Taking vitamin supplements is necessary to ensure good health (13.7%) and "Body weight is a good indicator of a healthy diet" (11.2%) indicating that fewer students hold misconceptions related to these statements. Students responses to statements relating to fat, and the relationship of physical activity and a healthy diet to overall health indicated that most of these students do not hold misconceptions in these areas. Only 68 students (22.5%) agreed with the statement "It is important to be sure that just about every food item I eat is low in fat" and only four students (1.4%) agreed with the statement "It is important to completely eliminate fat from one's diet" indicating that the majority of students surveyed do not hold these misconceptions related to fat intake. Nearly all of the students (84.2%) agreed with the statement "Overall health depends on both physical activity and a healthy diet" (only four disagreed) indicating that students surveyed are aware of the positive roles of physical activity and a healthy diet in overall health.

No obvious misconceptions were evident in the students' responses to items related to students' perceptions of the health effects of various foods; ratings of most students appeared fairly consistent with the nutrient density of the various food groups listed. As discussed earlier, the majority of students rated sweets, fast foods and snack foods as "very unhealthy." The majority of students also rated fruits and vegetables, and grain foods as "somewhat healthy" and "very healthy" (See Table 2). Cypel and Prather (1993) also studied the food perceptions of college students. Students perceived foods such as tuna, lettuce, chicken and most dairy products as being more nutritious, lower in calories, better for you, and more unprocessed than foods such as cola or chocolate. This is consistent with the responses of students in this study. Ratings of grain foods in the

present study as "somewhat healthy" or "very healthy" are not consistent with the results observed by Cypel and Prather. They found that students perceived high starch items such as pasta, potatoes, rice and bread as being relatively bad for you, high in calories, not nutritious and more processed. Miller and associates (1980) and Mitchell (1990) also observed similar misconceptions among college students related to bread and other starches. While it may be that students in this study are not typical of the general college population in relation to beliefs about breads and other starches, the most recent research available to compare with this study was published in 1993. The Food Guide Pyramid (United States Department of Agriculture, 1992) which advocates a healthy diet emphasizing breads, cereals, rice and pasta, was not released until 1992. It is possible that EIU students surveyed perceive grain foods such as rice and pasta to have healthier effects than students from previous studies because of greater exposure to tools such as the Food Guide Pyramid which encourage consumption of these foods as the foundation of a healthful diet.

Students surveyed appear to hold similar misconceptions to those held by the general adult population. Seventy-two percent of adults 25 and over surveyed by the American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997) believed that foods are either "good" or "bad" compared to 62.8% of EIU students surveyed. Adults also appeared to hold similar perceptions related to fat and the relationship of physical activity and a healthy diet to overall health. Only 13% of adults surveyed believed "It is important to totally eliminate fat from one's diet," and 81% believed "overall health depends on both physical activity and a healthy diet" indicating that adults surveyed do not hold misconceptions in these areas. The majority of EIU students surveyed also did not hold misconceptions in these areas.

Students' ratings for the healthfulness of these various food groups are consistent with the ratings given by adults surveyed in the American Dietetic Association 1997 Nutrition Trends Survey. Ninety-two percent of adults surveyed believed fruits and

vegetables have "very healthy" effects and 61% viewed grain foods as "very healthy." Dried beans, fish, poultry and dairy products were rated as either "somewhat healthy" or "very healthy" by 80% or more of adults surveyed. This is similar to EIU students surveyed with over 95% of participants rating fruits and vegetables, and grain foods as "very healthy" or "healthy," over 80% of participants rating dairy products and poultry as "very healthy" or "healthy," and 70% of participants rating dried beans as "very healthy" or "healthy." Meats and eggs received mixed responses with 58% of adults rating them healthy. This is similar to these students with 50% rating meats as healthy and 41.9% rating eggs as healthy. This similarity in responses of EIU students and adults surveyed by the American Dietetic Association suggests that these students have similar perceptions of the health effects of various foods as the adult population as a whole, indicating that educational needs of adults and students in these areas may also be similar.

In general, most adults' and students' perceptions of the health effects of the food groups listed are fairly consistent with each food group's nutrient density. However, some adults and students surveyed seem to be confused about the health effects of meats and eggs with about half of both groups rating them as healthy and about half rating them as neutral or unhealthy. Educators may need to teach adults and college students about the nutrient content of these foods and their proper role in the diet. Educators should stress that these foods contain important nutrients and when eaten in moderation can be positive contributors to a healthy diet. As with any food, meat and eggs can be potentially harmful when eaten in excess, so educators should stress the importance of eating all foods in moderation.

Misconceptions in two areas may be less common among students surveyed than among adults surveyed in the American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997). Thirty-eight percent of adults agreed with the statement "Taking vitamin supplements is necessary to ensure good health" compared to only 13.7% of students surveyed, and 35% of adults surveyed agreed with the

statement "Body weight is a good indicator of a healthy diet" compared to only 11.2% of students surveyed. There are several possible explanations for these differences. Older adults may be more focused on their health than are younger adults. Young adults may perceive themselves to be "immortal" and therefore may not feel a need to take action to prevent health problems, including supplement use. Students' vision of their future may indicate that educators should focus education on the immediate benefits of good nutrition rather than the long term effects of poor nutrition. This also may indicate that educators need to promote awareness of the feasibility of achieving all the necessary nutrients for good health through a reasonable and healthful diet among the adult population.

A possible explanation for adults belief in weight as an indicator of good health may be due to increasing concern over the health consequences of being overweight with age. Adults may be more aware of chronic health problems related to weight such as hypertension, heart disease and Type II diabetes, and it may be more difficult to maintain a desirable body weight as adults age. Adults may be encouraged more often than young adults by health professionals to decrease risk factors for these chronic disease by eating a healthy diet, achieving or maintaining a healthy weight, and exercising. Through this type of basic awareness education, adults may easily relate a healthy weight to a healthy diet. Educators may need to address this issue among college students by giving them a strong knowledge of the relationship of diet, weight and health problems. Students need to understand that although excess weight can be an added risk factor to chronic disease as can an unhealthy diet, not all obese individuals consume unhealthy diets and not all thin people consume healthy diets. Students need to develop an understanding of factors other than diet that may contribute to weight such as genetics, illnesses, eating disorders, appetite regulation disorders and physical activity levels. This knowledge will help them understand the multifactorial relationship among weight, health and diet as they age and weight becomes an increasing health concern.



### Perceived Importance of Healthful Eating and Regular Physical Activity

Responses to the question, "Overall, how important are diet and nutrition to you personally" suggest that healthful eating is not particularly important to most of these college students. About 38% (37.8%, or 116) of students surveyed rated diet and nutrition as important to them (6 or 7 on a 7-point Likert scale). Fifty percent of adults surveyed in the American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997) of adults surveyed rated diet and nutrition as important to them personally (6 or 7 on a 7-point Likert scale). This difference suggests that adults surveyed perceive healthful eating to be slightly more important to health than do college students surveyed. Perhaps this attitude is due to differences in priorities between college students and adults. As discussed earlier, young adults often perceive themselves to be "immortal" and as a result may not perceive healthful eating to be a high priority. Adults on the other hand, may become more aware of their health as they age and may rate healthful eating as a higher priority than college students. Also, students often have hectic schedules and are concerned with studies and other activities. Almost 60% (59.2%) of students surveyed cited "Keeping track of eating habits takes too much time" as a reason for not doing more to achieve healthful eating. Only 21% of adults surveyed cited this as a reason. Healthful eating may not be a top priority for them now, but these students may perceive that they will have more time to keep track of eating habits after college. More than two-thirds (69.6%) of students surveyed predicted that their efforts would increase after college.

Over half of students surveyed (54.7%, or 168) rated healthful eating with moderate ratings (3, 4, or 5 on a 7-point Likert scale) and 7.5% (23) rated healthful eating with "unimportant" ratings (1 or 2 on a 7-point Likert scale). This apparent apathy expressed by these college students could impact the quality of their intakes. Some researchers (Vickery et al., 1985; Patterson et al., 1995) have found that students who perceived nutrition as more important than other students tended to eat more fiber and

their diets were more likely to meet 100% of the Recommended Dietary Allowances for various nutrients. If this is the case, not believing in the importance of healthful eating could serve as a barrier to healthful eating.

Students' ratings of the importance of regular physical activity were slightly more positive than ratings for the importance of healthful eating. Almost 48% (47.9%, or 147) of students surveyed rated regular physical activity as important (6 or 7 on a 7-point Likert scale) compared with a 37.8% importance rating for healthful eating. Mean ratings were 5.28 for physical activity and 4.91 for healthful eating. More students may have rated physical activity as important because of beliefs that exercise is important for weight control.

Students are clearly concerned about their weight according to a study by Kennedy and associates (1995). Approximately 60% of female students and 33% of male students surveyed stated they constantly worried about becoming fat. Research (Kennedy et al., 1995; Haberman, 1998) has also shown that many college students view themselves as overweight. Haberman observed only 8% of students surveyed were overweight, however 50% of students whose BMIs (Body Mass Index = weight in kg/height in m<sup>2</sup>) resulted in their being classified as underweight rated themselves as overweight.

Some students may attempt to control their weight through exercise. Miller and associates (1980) explored motivation for exercise among college students and found that 11% of students surveyed used exercise as a weight loss method. Whether or not students are actually successful in controlling their weight through exercise, research (Kennedy et al., 1995) has shown that exercise may improve some students perceptions about their weight. Kennedy and associates observed that 42% of nonexercising males perceived themselves to be overweight compared to only 20% of exercising males. This difference between the perceptions of exercisers and nonexercisers was not observed among female students. The differences between the perceptions of male and female students will be discussed later. Students' concern about weight and use of exercise as a weight control

method could contribute to slightly greater belief in the importance of exercise. Further research needs to be performed to explore students' rationale behind their perceived importance of regular physical activity.

Whether or not a relationship exists between students' perceptions of their weight and their perceived importance of physical activity, results of this study indicate that few students surveyed perceive exercise to be of great importance. Almost half (49.2%, or 151) of students surveyed responded with moderate ratings (3, 4, or 5 on a 7-point Likert scale) when asked to rate the importance of regular physical activity and 3% (9) responded with "not important" ratings (1 or 2 on a 7-point Likert scale). Educators need to promote the importance of physical activity for health. Educators may also need to address students' preoccupation with weight. Benefits of exercise other than weight should be the focus of education and education related to accurately evaluating weight in relationship to overall health should be addressed.

It is unknown whether these perceptions are consistent with those of the rest of the college population because no literature could be found exploring college students' perceptions of the importance of regular physical activity. Researchers (Melby et al., 1986; Schulz, 1988; Frost, 1992; Kelley et al., 1995; Haberman & Luffey, 1998) have found the majority of college students surveyed to be sedentary. This sedentary behavior may not be due to lack of exercise knowledge, however, as researchers such as Melby and associates (1986) and Frost (1992) have observed that college students appear knowledgeable about exercise. It is possible that the perceptions of the importance of regular physical activity could affect actual exercise behavior in a similar manner to effects that perceptions of the importance of healthful eating may have on dietary behavior. If this is the case, then this apparent apathy towards the importance of physical activity expressed by students surveyed could contribute to limited physical activity among these students.

The ratings for importance of physical activity given by adults in the American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997) were slightly higher than were those of EIU students surveyed. Fifty-seven percent of adults rated exercise and physical activity as "important" (six or seven on a 7-point Likert scale). This would appear to indicate that older adults perceive exercise and physical activity to be slightly more important than college students surveyed, although few adults or students surveyed perceive exercise and physical activity of great importance. Slightly higher ratings by adults surveyed also could be due to greater health consciousness among adults as discussed earlier in relationship to misconceptions held by adults surveyed in the American Dietetic Association 1997 Nutrition Trends Survey.

#### Perceived Efforts Related to Achieving Healthful Eating and Regular Physical Activity

Students surveyed did not perceive themselves to be exerting a great deal of effort to achieve a healthy diet. When asked to rate how carefully they selected their food to achieve a healthy diet, less than half (42.2%, or 124) gave a "careful" response (5, 6, or 7 on a 7-point Likert scale), one-fourth (25.5%, or 78) responded with a neutral response (4 on a 7-point Likert scale), and 31.4% (99) responded with a "not careful" response (1, 2, or 3 on a 7-point Likert scale). Most students (86.4%, or 260) also did not feel they were doing all they could do to achieve a healthy diet, and only one-third (33.3%, or 103) of students reported doing more to achieve a healthy diet compared to before they started college. One-third (33.7%, or 104) of students actually reported doing less to achieve a healthy diet than before they started college. Only a few students (6.8%, or 21) rated themselves as active seekers of information. Slightly more than two-thirds (69.6%, or 215) of students did predict that their efforts to achieve a healthy diet would increase after college.

College students often have hectic schedules and irregular eating habits. Students in this study perceived a lack of time as a barrier to achieving healthful eating as did students in a study by Koszewski and Kuo (1996). College students may perceive that

they will have more time to monitor their eating habits when they settle into a routine after college. This could explain the students' perceptions that they are not doing all they can to achieve a healthy diet, and that their efforts will increase after college.

Also, students did not rate a healthy diet as greatly important which could also contribute to a perceived lack of effort to achieve a healthy diet. This explanation would be consistent with studies by Vickery and associates (1985) and Patterson and associates (1995). They observed that subjects who perceived a healthy diet as more important often had more adequate diets and exerted more effort to achieve a healthy diet than did subjects who perceived a healthy diet as less important.

Whether these perceptions are consistent with the college population overall is unknown because no literature could be found on the perceptions of college students' own individual efforts to achieve healthful eating styles. Studies such as Vickery and associates (1985) did indicate that college students may overrate the adequacy of their diets. This inaccurate evaluation may lead to a false sense of security and a perceived lack of need to do more to achieve a healthy diet. If a student perceives his/her diet as "adequate" he/she may see no need to exert greater effort to achieve an even healthier diet, and if a student perceives his/her diet as grossly inadequate, he/she may perceive healthful eating to be too difficult and abandon efforts. It is unknown whether students surveyed in this study inaccurately evaluated their diets since they were not asked to rate the adequacy of their diets, nor were the actual nutrient contents of their diets examined.

Responses of the college students in this study were similar to responses of adults surveyed in the American Dietetic Association 1997 Nutrition Trends Survey. Sixty-one percent of adults said they currently were not doing all they could to achieve healthful eating. Younger adults (25-34 years old) were more likely than older adults (55 and older) to respond that they are not doing all they can to achieve healthful eating. These results may support the belief by college students that their efforts to achieve healthful eating will indeed increase when they are older.

Students' ratings of their efforts to achieve regular physical activity were slightly higher than their ratings of their efforts to achieve a healthy diet. Just over half (51.6%) of students surveyed rated themselves as making conscious efforts to get regular physical activity (5, 6, or 7 on a 7-point Likert scale). These results may not be consistent with those of Melby (1986), Schulz (1988), Frost (1992), Kelley (1995) and Haberman (1998), who observed that the majority of students were not engaged in regular physical activity. Melby and associates observed that college students were knowledgeable about exercise and discounted lack of exercise knowledge as a reason for college students' sedentary behavior. It should be noted however, that results of this study are not directly comparable to those of the existing research mentioned because actual exercise behavior was not measured in this study.

Adults in the American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997) responded with slightly lower ratings for physical activity efforts than did these college students with 43% of adults surveyed rated themselves as making a conscious effort to get regular physical activity (5, 6, or 7 on a 7-point Likert scale). As mentioned previously, adults surveyed rated physical activity as slightly more important than did these college students although few adults or students surveyed rated physical activity of great importance. It is possible that although college students surveyed perceived physical activity of less importance than adults surveyed, they may have more opportunities to exercise because of access to on-campus exercise facilities, intramural sports, physical education classes, and varsity sports. Greater convenience and opportunities for physical activity may result in greater perceived efforts to achieve regular physical activity by these students, even though the importance of physical activity may not be fully recognized by these students. Also, students appear to be very weight conscious and often perceive themselves to be overweight according to research by Kennedy (1995) and Haberman and associates (1998). Miller and associates (1980) observed that some students view exercise as a method of weight control. Some

students may perceive themselves to make greater efforts to exercise regularly because of use of exercise to control their weight. It is unknown whether this could account for the difference in perceived efforts to perform regular physical activity because students surveyed were not asked about their motivations for exercise or their perceptions of their weight, and little research is available exploring these issues among adults.

Educators are faced with several tasks related to these perceptions. First of all, further research needs to be done to find out if these perceptions are accurate. It is possible that students also could have inaccurate perceptions of their own efforts to achieve healthful eating and regular physical activity. If students are indeed exerting little effort to achieve healthful eating and regular physical activity, then perceived barriers to achieving healthful eating cited by college students should be addressed as discussed earlier, and further research to address barriers to regular physical activity should be performed. Further research would help educators know where efforts should be focused to help students increase their efforts. Also, studies should be performed allowing students to give direct input as to what would motivate them to increase their efforts. Current research indicates that efforts for both healthful eating and physical activity are less than students' best. Allowing students to tell educators directly what is necessary to help them increase their efforts would give educators a more accurate picture of what types of education would be most effective.

#### Differences in Responses Between Male and Female Students

Perceived barriers to achieving healthful eating. Two significant differences were observed between male and female responses related to perceived barriers to achieving healthful eating. Slightly more females than males cited the statement "I don't want give to up foods that I like" as a reason for not doing more to achieve healthful eating ( $p < .040$ ), and slightly more males than females cited "Regulating eating habits is only important for people who have health risks" as a reason for not doing more to achieve healthful eating ( $p < .022$ ). To what extent these results are consistent with the overall

college population is unknown because little literature is available comparing perceived barriers of male and female college students related to nutrition. No differences between responses of adult males and females for perceived barrier items were reported for the American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997). Differences between male and female college students observed with regards to misconceptions, perceived importance of healthful eating and regular physical activity and perceived efforts to achieve healthful eating and regular physical activity discussed in the following sections may help explain these differences.

Misconceptions related to diet and nutrition. Several differences were observed between the responses of male and female students related to misconceptions associated with diet and nutrition. Female students appeared to agree slightly more than did males with the statements "Taking vitamin supplements is necessary to ensure good health" ( $p < .006$ ), "I should never eat some foods" ( $p < .040$ ) and "Every food I eat should be low in fat" ( $p < .034$ ). Few students overall agreed with these statements however, indicating these were not significant misconceptions for students surveyed. Male students appeared to disagree slightly more than did female students with the statement "It is important to monitor total calories from all foods in one's diet" ( $p < .030$ ) indicating a misconception, although few students overall disagreed with this statement. Although no recent literature was found comparing misconceptions between male and female college students, these results are not consistent with a 1973 study by McCarthy and Sabry who observed that male and female students had similar scores on misconception questionnaires. Differences between male and female students regarding beliefs about vitamin and mineral supplementation are consistent with results from the American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997) which revealed that more adult women than adult men believe they need supplements to ensure proper health.



Several of these differences in misconceptions could help explain the differences in perceived barriers between male and female college students. More females than males cited the statement "I don't want to give up foods that I like" as a reason for not doing more to achieve healthful eating. This could indicate that females perceive a greater need to avoid certain foods to achieve a healthy diet than do males. The greater agreement by female students with statements such as "I should never eat some foods," "It is important to monitor total calories from all foods in one's diet," and "Every food I eat should be low in fat" could explain why female students feel that giving up foods that they like is more of a barrier than do males.

Another difference in perceived barriers between male and female students could also possibly be linked to differences in misconceptions between male and female college students. Slightly more males than females cited the statement "Regulating eating habits is only important for people who have health risks" as a reason for not doing more to achieve healthful eating although neither group cited it as a major reason for not doing more to achieve healthful eating. This may suggest that females have slightly more concern over their eating habits than males.

Vickery and associates (1985) observed a link between concern over personal dietary behavior and supplement usage. Compared to other female students they surveyed, female students who expressed greater concern about their dietary practices were more likely to use nutrient supplements as a safeguard against dietary deficiencies. It is possible that in this study also since females students expressed greater concern over dietary behavior they were also more likely to believe that vitamin supplementation is necessary for health.

This greater concern over eating habits by females also appears consistent with the differences in perceptions of the health effects of sweets and fast foods and differences in beliefs about monitoring calories between males and females. Females appeared to rate fast foods such as Pizza Hut pizza and McDonald's hamburgers as more unhealthy than

did males ( $p < .003$ ) and also appeared to rate sweets as being more unhealthy ( $p < .008$ ). Female students also expressed greater belief than did males that total calories from all foods in one's diet should be monitored which also may indicate that females are more concerned about their diets than are males.

Perceived importance and perceived efforts related to healthful eating and regular physical activity. Several differences in responses between male and female students were observed related to the importance of healthful eating and perceived efforts to achieving healthful eating and regular physical activity. Female students appeared to rate healthful eating with slightly higher importance than did males ( $p < .006$ ), although few students in either group rated healthful eating of great importance. Female students also rated themselves as selecting their food slightly more carefully than did males ( $p < .006$ ) and rated themselves as more active seekers of nutrition information than did male students ( $p < .004$ ). These results also suggest that these female students in general have a slightly greater degree of concern about their personal diets than do male students.

Females may exhibit more concern about personal diet than do males because of their greater concern over weight. Kennedy and associates (1995) observed that female students were more weight-preoccupied than were male students with 60% of all female respondents stating they were constantly worried about being or becoming fat compared to only 33% of males, and fewer males than females reported being on a weight-loss diet. These greater concerns about weight could prompt female students to take greater care to achieve a healthy diet including taking greater care in selecting food and taking more active measures to seek nutrition information.

Differences in degree of concern about personal diet as well as differences in perceived health effects of foods could explain the differences in dietary behaviors revealed in studies by Kahn (1983), Herson and associates (1986), Lieux and Manning (1992), Huang and associates (1994) and Haberman and Luffey (1998). Huang and associates, Lieux and Manning and Haberman and Luffey observed that male students

tended to have higher fat intakes than did female students. Kahn observed that male students tended to have higher sodium intakes than did female students. Perhaps, female students' greater concern over eating habits could translate into healthier intakes. No dietary intake data were collected in the present study, however, to assess this potential relationship.

These results have several implications for educators. While greater concern for healthful eating could be expected to have a positive effect on students' intakes, there may be several possible negative results. The beliefs by female students that they need to give up favorite foods and that there are some foods they should never eat, could cause students to restrict their diets and avoid favorite foods leading to feelings of deprivation and eventual abandonment of efforts to achieve healthful eating. Also, these females' belief that vitamin supplementation is necessary to ensure good health may lead to potentially dangerous intakes of certain nutrients, and may lead them to squander hard earned money on expensive supplements.

Educators may first need to address female students' weight concerns. Showing female students healthy and realistic weight goals as opposed to ideal weights presented in the media may help alleviate some of female students' fears and would set the stage for education about including a variety of foods in the diet, and eating every food in moderation. Students may feel more comfortable including some of their favorite foods in their diets' with a new understanding of what it means to eat a healthy diet. This could encourage students to enjoy eating and to develop healthful eating habits they can maintain for a lifetime.

Males, however, rated themselves as making a slightly more conscious effort to achieve regular physical activity than did females ( $p < .017$ ). This is consistent with results observed by Kelley (1995), Kennedy and associates (1995), Schulz (1988) and Melby and associates (1986) who found that female students studied were more sedentary than males. One study by Haberman and Luffey (1998) observed no differences in

frequency of exercise between male and female students surveyed. It is possible that male students have greater opportunities to be involved in sports at some college campuses and may feel greater societal pressure to fit a certain image of fitness and strength than do females. It is possible that such pressures could cause males to perceive a greater degree of personal effort to exercise regularly than do females. Also, Kennedy and associates (1995) observed that both exercising and nonexercising male students were somewhat conscious of their weights. It is possible that males choose to attempt to control their weight through exercise due to possible greater opportunities for involvement in sports and societal pressures mentioned. This could account for male students' greater perceived efforts to exercise regularly.

These results have several implications. First of all, males may become reliant on physical activity to maintain their health. Males appear to be slightly less concerned about healthful eating than do females which could possibly be because of their perceptions of their efforts to achieve regular physical activity. Individuals who exercise regularly may believe they are free to eat whatever they want in whatever quantity they want. Educators may need to remind students who hold this belief that exercise is not the complete answer for health. Educators need to find ways to encourage males to increase their efforts to achieve healthful eating. Also, some male students have exhibited concern about their weight according to Haberman and Luffey (1998). Although this concern is not as great as female students' weight concerns, males could benefit from similar education suggested for females addressing healthy weights for different body types versus the ideal body types presented in the media. The health benefits of exercise and healthful eating should be emphasized to both males and females such as benefits related to self-esteem and stress relief. Educators may also need to perform research to explore possible barriers to achieving regular physical activity among college students to explore whether females perceive more barriers to achieving healthful eating than do males.

### Differences in Responses Between On-campus and Off-campus Diners

Perceived barriers to achieving healthful eating and misconceptions related to diet and nutrition. Slightly more on-campus than off-campus diners cited a lack of healthy food alternatives as a reason for not doing more to achieving healthful eating ( $p < .011$ ), although 50% or more of both groups said this was not a reason. No literature could be found comparing perceived barriers between these two groups, but these results are consistent with investigators' experience with many college students' verbal complaints about the healthfulness of dining hall food. Greater belief in the need to eliminate fat from one's diet could contribute to a greater belief in a lack of healthy food alternatives for some students. On-campus diners agreed slightly more strongly than did off-campus diners with the misconception statement "It is important to completely eliminate fat from one's diet" ( $p < .036$ ) although few students from either group agreed with this statement.

Literature available comparing the actual barriers of on-campus and off-campus residents does not necessarily support these on-campus diners' perception of a lack of healthy food alternatives. Brevard and Ricketts (1996) observed that off-campus residents consumed a higher percentage of energy from protein, had higher tri-glyceride levels and higher ratios of total cholesterol to HDL. Melby (1986) observed that off-campus residents also consumed fruits and vegetables less frequently than on-campus residents. These results indicate that on-campus residents may actually consume healthier diets than do those living off-campus. Results of a study by Haberman and Luffey (1998) did observe that students living on-campus were more likely to eat the same foods day after day than students who lived in off-campus residences. The findings of these various studies do not necessarily support students' perceptions that there aren't enough healthy food alternatives available. Results of these various studies, however, are not directly comparable due in part to the different ways students were classified.

Two other significant differences were observed between on-campus and off-campus diners related to perceived barriers to achieving healthful eating, and

misconceptions associated with diet and nutrition, but no obvious reasons exist to explain these differences. Off-campus diners agreed slightly more strongly with the statement "Overall health depends on both physical activity and a healthy diet" ( $p < .046$ ). No comparable studies are available, but research is available related to exercise behavior of on-campus and off-campus residents. Haberman and Luffey (1998), Brevard and Ricketts (1996) and Melby (1986) found no significant differences in the exercise behavior of on-campus and off-campus residents. Slightly more on-campus than off-campus diners cited "Regulating eating habits is only important for people who have health risks" as a reason for not doing more to achieve healthful eating, but few students in general cited this as a reason. No literature could be found to explain these findings, and no obvious explanation exists for this perception.

These results have several implications for educators. First of all, educators can show students that fat has a place in a healthful diet, teach students that healthful foods are nutrient dense foods that include a variety of vitamins, minerals and other nutrients and that any food can be included in a healthful diet. This may help students recognize that the foods available to them in dining services are not as unhealthy as originally perceived. Educators can also help students evaluate their intakes so they will be aware of what they are actually eating. Typical off-campus and on-campus meals can be compared to show students that eating meals outside of dining services does not ensure healthful food choices. Both groups need to learn how to make healthful food choices in any situation, so that they will not feel they are without options no matter what situation they encounter. Also, nutrient contents of foods could be posted in dining services to promote awareness of the healthful food alternatives available. Students also should be taught that their food choices outside of dining services are also important. Showing students how to make healthful snack choices and how to prepare easy healthful snacks in dorm rooms may help students feel they have more control over their intakes and more options.

Future efforts to achieve healthful eating and efforts to seek nutrition information.

Significant differences in responses between on-campus and off-campus diners were also observed for items related to future efforts to achieve healthful eating and efforts to seek nutrition information. Slightly more off-campus diners anticipated doing more to achieve healthful eating after college than did on-campus diners ( $p < .035$ ). No comparable literature was available and no obvious explanation exists for this perception.

Off-campus diners were more likely to rate themselves as active seekers of nutrition information than were on-campus diners ( $p < .049$ ). Off-campus diners are more likely to perceive themselves as having control of their own meal preparation or purchase as compared to on-campus diners who may perceive themselves as having little control over what food is offered to them through dining services. As a result of this greater perceived control over food choices, off-campus diners may perceive themselves to more actively seek nutrition information as a part of the decision making process related to their food preparation or purchase. No comparable literature was available.

These results have several implications for nutrition educators. Off-campus diners may need to be reminded of the immediate benefits of healthful eating to encourage them to increase their present efforts to achieve healthful eating. Research should be performed to explore whether students' perceptions of their efforts to seek nutrition information are valid. If on-campus diners are in fact found to be less active seekers of nutrition information than are off-campus diners, then research may also need to be performed to explore possible barriers for on-campus students to seeking nutrition information. Educators may need to find ways to make nutrition information more available to on-campus diners, or may need to make students aware of nutrition information already available to them. Research may also need to be performed to determine what types of nutrition information off-campus diners are seeking. Gathering information from unreliable sources could contribute to poor food choices for off-campus diners.

## Summary, Conclusions, and Recommendations

### Summary

The purpose of this study was to explore Eastern Illinois University (EIU) students' (a) perceived barriers to achieving healthful eating (b) misconceptions related to nutrition, (c) perceptions of the importance of healthful eating and physical activity and (d) perceptions of their own efforts to achieve healthful eating and physical activity. Three hundred-nine students ages 18-25 were surveyed during the first week of classes of the 1998 spring semester in seven sections of an introductory nutrition course. The questionnaire was modeled after the American Dietetic Association 1997 Nutrition Trends Survey questionnaire (American Dietetic Association, 1997) which explored many of these issues among American adults.

Results revealed that these students perceive several factors to be barriers to achieving healthful eating. Students cited the statements "I don't want to give up foods that I like," "It seems like I'm always hearing information about what not to eat, rather than what I should eat," "It takes too much time to keep track of my eating habits," "I am satisfied with the way I regulate my eating habits," and "There are so many new and conflicting studies I don't know what's good for me anymore" most often as reasons for not doing more to achieve healthful eating. Results of researchers (Lloyd et al., 1995; Koszewski and Kuo, 1996; American Dietetic Association, 1997) indicate that the adult population as a whole and EIU students may perceive similar factors to be barriers to achieving healthful eating.

Results indicate that students hold some misconceptions related to nutrition. The majority of students surveyed agreed with the statement "Nutritionally speaking I believe there are good and bad foods," indicating a possible misconception. Adults in the American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997) also believed this misconception indicating that students surveyed may hold similar misconceptions to the adult population as a whole. Students surveyed



tended to rate sweets, fast foods and snacks and "very unhealthy," and fruits and vegetables as "somewhat healthy" or "very healthy," which is consistent with results of studies (Cypel and Prather, 1993; American Dietetic Association, 1997) of both the adult population and the college population. The majority of students surveyed perceived grain foods to be healthy, which is not consistent with the results of earlier studies (Miller et al., 1980; Mitchell, 1990) of other college students.

Students surveyed were relatively apathetic about the importance of healthful eating and physical activity. Apathy towards the importance of healthful eating could impact the quality of students' intakes according to results observed by Vickery and associates (1985), and Patterson and associates (1995). If apathy about the importance of physical activity has effects on actual physical activity similar to the effects that apathy about healthful eating have on actual dietary intake, students may not perform physical activity regularly. The American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997) revealed that adults may perceive exercise and physical activity to be more important than do these students.

Students did not perceive themselves to be exerting a great deal of effort to achieve healthful eating. Less than half of students surveyed reported carefully selecting their food to achieve a healthy diet. The majority of students did not feel they were doing all they could do to achieve a healthy diet, reported exerting the same or less effort to achieve healthful eating than before college, and did not rate themselves as active seekers of nutrition information. Students did predict that their efforts would increase after college. College students may feel that they are unable to give their best efforts to achieve a healthy diet because of their perception that keeping track of eating habits takes too much time, and their relatively apathetic attitude towards the importance of healthful eating. Students' responses were similar to responses given by adults in the American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association,

1997) which indicates that adults may have similar perceptions to college students of their efforts to achieve a healthy diet.

Just over half of students surveyed reported making efforts to achieve regular physical activity. These results were not consistent with studies by Melby and associates (1986), Schulz (1988), Frost (1992), Kelley and associates (1995), and Haberman and Luffey (1998) which indicated that the majority of college students surveyed were not engaged in regular physical activity. These students' ratings were also higher than those of adults surveyed in the American Dietetic Association 1997 Nutrition Trends Survey (American Dietetic Association, 1997). This could possibly be because of greater convenience and opportunities for involvement in physical activity currently on college campuses.

Several significant differences were observed between responses of male and female students surveyed. Female students appear to be more concerned about healthful eating than did male students. Females appeared to rate healthful eating with slightly higher importance than did males, rated themselves as selecting their food slightly more carefully than did male students, and rated themselves as more active seekers of information than did males. Females cited the statement "I don't want to give up foods that I like" as a reason for not doing more to achieve healthful eating slightly more often than did males and males cited "Regulating eating habits is only important for people who have health risks" as a reason for not doing more to achieve healthful eating slightly more often than did females. Female students surveyed also had greater belief in the misconception statement "I should never eat some foods," and the statement "It is important to monitor total calories from all foods in one's diet." All of these differences could indicate that these female students have slightly greater concern for their eating habits than do male students. This greater concern for eating habits could also contribute to female students greater belief that vitamin supplementation is necessary for health, which is consistent with results of studies such as Vickery and associates (1985). This

greater concern could also contribute to female students' greater belief that sweets and fast foods have an unhealthy effect on overall health.

These differences between responses of male and female students could explain the differences in dietary behavior between male and female students observed in studies by Kahn (1983), Hernon and associates (1986), Lieux and Manning (1992), Huang and associates (1994) and Haberman and Luffey (1998). Males did rate themselves as making a slightly more conscious effort to achieve regular physical activity which is consistent with results observed by Kelley (1995), Kennedy and associates (1995), Schulz (1988) and Melby and associates (1986) who found that female students studied were more sedentary than male students.

Differences observed in responses between students who ate at least 61% of their meals in on-campus dining services (on-campus diners) and those who did not (off-campus diners) were in the areas of perceived barriers to achieving healthful eating, misconceptions related to diet and nutrition, future efforts to achieve healthful eating, and efforts to seek nutrition information. On-campus diners cited a lack of healthy food alternatives as being a barrier to achieving healthful eating more often than off-campus diners. Research related to the actual dietary behavior indicates that this may not be a greater actual barrier to achieving healthful eating because results from previous research (Melby, 1986; Brevard & Ricketts, 1996) indicated that on-campus residents actually had healthier diets than students living off campus. Off-campus diners cited the belief that regulating eating habits is only important for people who have health risks as a reason for not doing more to achieve healthful eating than did on-campus diners. No obvious reason exists for this perception.

Off-campus diners also had a slightly greater belief that overall health depends on both physical activity and a healthy diet and on-campus diners agreed slightly more with the misconception "It is important to completely eliminate fat from one's diet." There

appears to be no obvious explanation for these differences as available literature has observed no differences in these areas between these two groups.

A slightly higher percentage of off-campus diners anticipated doing more to achieve healthful eating after college, and off-campus diners were more likely to rate themselves as active seekers of nutrition information. Off-campus diners may perceive themselves as having more control over their food preparation or purchase than on-campus diners and as a result may perceive themselves to more actively seek nutrition information when making decisions related to their food preparation and purchase. There were no significant differences observed between responses of on-campus and off-campus diners in relationship to the perceived importance of healthful eating and regular physical activity and perceived efforts to achieve regular physical activity.

### Conclusions

Conclusions about EIU students will be presented in the order of the objectives as presented in the introduction. A primary objective of this study was to identify factors students perceive as barriers to achieving healthful eating. Conclusions that can be drawn from results are as follows: many students (a) are unwilling to give up favorite foods to achieve healthful eating, (b) are tired of negative nutrition messages and are ready for a more positive approach to nutrition education, (c) feel they don't have enough time to keep track of their eating habits, (d) are satisfied with their eating habits and (e) are confused by conflicting reports related to nutrition information.

A second primary objective of this study was to explore students' misconceptions related to diet and nutrition. Conclusions that can be drawn from results are as follows: (a) many students believe there are good and bad foods indicating a misconception; (b) many students perceive typical snack foods and fast foods as unhealthy which could cause them to label favorite foods as "bad" foods; (c) few students hold misconceptions related to fat intake explored in this study; and (d) most students understand that both physical activity and a healthy diet are important to overall health.

This study also addressed several secondary objectives as well. One secondary objective of this study was to identify students' perceptions of the importance of healthful eating and regular physical activity. Results indicate that most students are relatively apathetic towards the importance of both healthful eating and regular physical activity. Many students may perceive physical activity to be slightly more important to overall health than healthful eating.

An additional secondary objective of this study was to identify students' perceptions of their personal efforts to achieve healthful eating and regular physical activity. This study has shown that many students: (a) do not perceive themselves to be exerting a great deal of effort to achieve healthful eating and regular physical activity, (b) do not perceive themselves to be active seekers of nutrition information and (c) anticipate that their efforts to achieve healthful eating will increase after college.

This study also explored differences in relation to the previously mentioned objectives between male and female students, and between on-campus and off-campus diners. Differences observed between male and female students related to perceived barriers are as follows: (a) fear of giving up favorite foods appears to be a greater perceived barrier for female students than for male students; and (b) the belief that regulating eating habits is only important for people who have health risks appears to be a greater perceived barrier for male than for female students. Differences observed between male and female students related to misconceptions are as follows: (a) slightly more female than male students believe the misconceptions that vitamin supplements are necessary to ensure good health, some foods should never be eaten, and every food eaten should be low in fat; and (b) female students are slightly more likely than male students to believe that fast foods and sweets have unhealthy effects on overall health. Differences observed between male and female students related to perceived importance of healthful eating and physical activity are as follows: (a) female students appear to believe that healthful eating is slightly more important than do male students; (b) male students

appear to believe that regular physical activity is slightly more important than do female students; and (c) male students appear to perceive themselves to be exerting slightly greater effort to achieve regular physical activity than do female students.

A few differences in perceptions appear to exist between on-campus diners and off-campus diners. Differences in perceptions between these two groups are as follows: (a) on-campus diners appear to perceive a lack of healthy food alternatives to be a slightly greater barrier to achieving healthful eating than do off-campus diners; (b) the belief that regulating eating habits is only important for people who have health risks appears to be a slightly greater perceived barrier for on-campus diners than for off-campus diners; (c) off-campus diners appear to have a slightly stronger belief in the misconception that fat should be completely eliminated from the diet than do on-campus diners; (d) off-campus diners appear to have a slightly stronger belief that overall health depends on both physical activity and a healthy diet than do on-campus diners; and (e) off-campus diners are more likely to anticipate that their efforts to achieve healthful eating will increase after college, and are more likely to perceive themselves as active seekers of nutrition information.

### Recommendations

This study has revealed several beliefs, misconceptions and other perceptions relating to healthful eating and regular physical activity among college students that could act as barriers to healthful eating and physical activity. Educators need to act as facilitators for students to help them overcome perceived barriers. Students need to believe that achieving healthful eating and regular physical activity is not only feasible but enjoyable and beneficial. Instead of simply telling students what to eat, educators need to teach students hands-on, practical methods to achieve healthful eating and regular physical activity that are relevant to their specific lifestyles.

All of these implications translate into a more positive, "user-friendly" approach to nutrition education. Examples of this type of education might include showing

students easy ways to incorporate fruits and vegetables into favorite dishes, quick and healthful snack ideas, and how to choose healthful foods when dining out or eating in dining services. Also, educators could use positive language when teaching nutritional guidelines to help students feel they are taking positive action to achieve healthful eating, as opposed to following a restrictive list of “do’s” and don’ts.” Education should also include emphasis on including all foods in moderation in a healthful diet. An example of this type of education might be showing students examples of healthful daily intakes including servings of their favorite “junk foods.” This type of education could help change students’ perceptions that foods are either “good” or “bad” and that they must avoid favorite foods to achieve healthful eating. Educators could also help students include results of new research in the proper context in relation to the body of nutrition research as a whole to alleviate confusion and frustration over the changing nature of nutrition research. All of these types of education could help students feel able to take control of their eating habits, and feel less at the mercy of their busy schedules.

Educators also are faced with the task of addressing students’ apathetic attitudes towards the importance of healthful eating and regular physical activity and lack of effort to achieve healthful eating and regular physical activity. Students may be rather short sighted in their view of personal health and may not anticipate a time when poor health habits will take their toll. As a result, educators may need to include education on the immediate benefits of healthful eating and regular physical activity instead of focusing only on the long term effects of poor eating habits and inactivity. Benefits emphasized might include increased energy, increased resistance to illness and stress relief. Further research should also be performed to see if students’ perceptions of their efforts to achieve regular physical activity are accurate, and to identify students’ perceived barriers to achieving regular physical activity.

Educators may also need to tailor their approach to meet the needs of both males and females, and of on-campus and off-campus diners. Females may have a slightly

greater need for education emphasizing the importance of including all foods in moderation in the diet, and may need examples of healthful daily intakes including servings of their favorite “junk foods” than do male students. Females may also have a greater need for education relating to the feasibility of achieving Recommended Daily Allowances for all nutrients through healthful eating than do males due to their slightly greater belief that vitamin supplementation is necessary to ensure good health. Male students may have a slightly greater need for education addressing the immediate benefits of healthful eating than do female students.

On-campus and off-campus diners may also need specialized education. More on-campus diners than off-campus diners perceive a lack of healthy food alternatives to be a barrier to achieving healthful eating. Educators need to show students how to evaluate their intakes so they will be aware of the actual nutrient density of foods they are consuming. On-campus diners should be shown the nutrient contents of the foods offered in dining services to show that foods offered may be more healthful than they originally perceived. Education for on-campus diners also needs to emphasize the principle of eating all foods in moderation and the principle that all foods can fit in a healthful eating plan. Both groups should be shown how to make healthful food choices in any situation so they will be in control of the quality of their food intake no matter what situation they find themselves in.

All of these methods will help students take control of their eating habits, and will dispel their perceptions that they are at the mercy of their schedules and living arrangements. Teaching students nutrition related knowledge is not enough. Educators must become facilitators to help students put this knowledge into practice. Helping students believe that healthful eating and regular physical activity is important to them now and showing them practical ways to achieve these behaviors will help students develop healthy lifestyles that can last a lifetime.



## Appendices

## Appendix A

The following survey is a tool to gather data for a master's thesis regarding nutrition and the college population. Your completion of this survey is an important part of this research. Your cooperation and care in completing this survey is very much appreciated.

## Survey

For each of the following items, please darken the appropriate circle on the scantron sheet to indicate your response. There are no right or wrong answers, and you will be an anonymous participant in this study. Please make sure that you respond to every item and record **all** responses on the scantron sheet.

1. Which choice best describes your living arrangements?

- a) Live in a residence hall
- b) Live in Greek Court
- c) Live in Greek housing other than Greek Court
- d) Live in University Apartments
- e) Live in University Court Apartments
- f) Live off campus

2. Which dining service meal ticket do you have?

- a) 11 meals per week
- b) 14 meals per week
- c) 18 meals per week
- d) Do not have a meal ticket

3. How often do you eat meals in residence hall dining services?

- a) 96-100% of the time
- b) 80-95% of the time
- c) 61-79% of the time
- d) 40-60% of the time
- e) 1-39% of the time
- f) 0% of the time

4. How often do you or someone else in your household prepare your meals? **This question DOES NOT apply to residence hall students. If you live in a residence hall darken the space for "g."**

- a) At least 90% of the time
- b) 75-89% of the time
- c) 50-74% of the time
- d) 25-49% of the time
- e) 1-24% of the time
- f) 0% of the time

5. How often do you prepare meals in your dorm room or residence hall kitchenette? **This question applies to residence hall students only. If you do not live in a residence hall darken the space for "g."**

- a) At least 90% of the time
- b) 75-89% of the time
- c) 50-74% of the time
- d) 25-49% of the time
- e) 1-24% of the time
- f) 0% of the time

6. How often do you eat meals in a restaurant or fast food establishment, or order take out food?

- a) At least 90% of the time
- b) 75-89% of the time
- c) 50-74% of the time
- d) 25-49% of the time
- e) 1-24% of the time
- f) 0% of the time

7. How actively do you seek information about nutrition and healthy eating?

- a) Very Actively      b) Quite Actively      c) Somewhat Actively  
 d) Seldom seek information      e) Do not seek information

Rate the following items on a scale from **1 to 7** according to degree of importance to you. **1** means **not at all important**, and **7** means **very important**. Darken the appropriate circle on your scantron sheet.

	(not at all important)						(very important)
8. Overall, how important is healthful eating to you personally?	1	2	3	4	5	6	7

	(not at all important)						(very important)
9. Overall, how important are exercise and physical activity to you personally?	1	2	3	4	5	6	7

Please rate the following statement on a scale from **1 to 7** where **1** means you **are not at all careful**, and **7** means you **are very careful**. Darken the appropriate circle on your scantron sheet.

	(not at all careful)						(very careful)
10. To what extent would you say that you carefully select what you eat to achieve a healthy diet?	1	2	3	4	5	6	7

Please rate the following statement on a scale from **1 to 7** where **1** means you **make little or no effort**, and **7** means you **make a very conscious effort**. Darken the appropriate circle on the scantron sheet.

	(little or no effort)						(very conscious effort)
11. To what extent would you say that you make a conscious effort to regularly get exercise and physical activity?	1	2	3	4	5	6	7

12. Which of the following statements **do you agree with more?** (Choose only **one** and darken the appropriate circle on the scantron sheet.)

a. I can include any food in my diet as long as I watch my fat intake overall.

b. It is important to be sure that just about every food item I eat is low in fat.

Using a scale of **1 = strongly disagree to 7 = strongly agree**, rate your agreement with the following statements. Darken the appropriate circle on the scantron sheet.

	(strongly disagree)							(strongly agree)
	1	2	3	4	5	6	7	
13. Nutritionally speaking, I believe there are such things as "good foods" and "bad foods."	1	2	3	4	5	6	7	
14. Overall health depends on both physical activity and a healthy diet.	1	2	3	4	5	6	7	
15. Body <u>weight</u> is a good indicator of a healthy diet.	1	2	3	4	5	6	7	
16. Taking vitamin supplements is necessary to ensure good health.	1	2	3	4	5	6	7	
17. It is important to completely eliminate fat from one's diet.	1	2	3	4	5	6	7	
18. It is important to monitor total calories from all foods in one's diet.	1	2	3	4	5	6	7	
19. Based on the information I've heard, I believe that there are some foods I should never eat	1	2	3	4	5	6	7	

20. Do you feel that you are currently doing **all you can** to achieve good nutrition and a healthy diet?

a) Yes      b) No

21. Compared to before you started college, would you say you are doing more, less, or about the same to achieve good nutrition and a healthy diet?

a) More      b) Less      c) The Same

22. Do you anticipate doing more, less, or about the same to achieve good nutrition and a healthy diet after you leave college and later on in your life?

a) More      b) Less      c) The Same

Read each of the following statements. If the statement is a major reason for you not doing more to achieve healthful eating, darken the circle for the choice "Major Reason." If it is a minor reason, darken the circle for "Minor Reason", and if it is not a reason for you not doing more to achieve healthful eating darken the circle for "Not a Reason."

	<b>Major Reason</b>	<b>Minor Reason</b>	<b>Not a Reason</b>
23. It takes too much time to keep track of my eating habits.	<b>a</b>	<b>b</b>	<b>c</b>
24. I don't know or don't understand the guidelines for diet and nutrition.	<b>a</b>	<b>b</b>	<b>c</b>
25. I don't want to give up foods that I like.	<b>a</b>	<b>b</b>	<b>c</b>
26. There aren't enough healthy food alternatives available.	<b>a</b>	<b>b</b>	<b>c</b>
27. Regulating eating habits is only important for people who have health risks.	<b>a</b>	<b>b</b>	<b>c</b>
28. I am satisfied with the way I regulate my eating habits.	<b>a</b>	<b>b</b>	<b>c</b>
29. There are so many new and conflicting studies on nutrition that I don't know what's good for me anymore.	<b>a</b>	<b>b</b>	<b>c</b>
30. I am confused by all of the reports that give dietary advice.	<b>a</b>	<b>b</b>	<b>c</b>
31. It seems like I'm always hearing information about what <u>not</u> to eat, rather than what I <u>should</u> eat.	<b>a</b>	<b>b</b>	<b>c</b>
32. It is difficult to find foods appropriate specially prescribed dietary needs. (e.g. diabetes, ulcers, allergies etc.)	<b>a</b>	<b>b</b>	<b>c</b>

For each of the following food groups listed below, choose the response that best reflects the impact you feel the food group has on your overall health. Does the food group have a **very unhealthy effect**, a **somewhat unhealthy effect**, **no effect at all**, a **somewhat healthy effect**, or a **very healthy effect** on your overall health? Darken the appropriate circle on your scantron sheet.

	Very unhealthy	Somewhat unhealthy	No effect	Somewhat healthy	Very healthy
33. Grain foods, such as pasta, bread, and rice.	1	2	3	4	5
34. Fruits and vegetables.	1	2	3	4	5
35. Meat, such as beef, pork, and lamb.	1	2	3	4	5
36. Poultry, such as chicken and turkey.	1	2	3	4	5
37. Fish and seafood, such as flounder, cod, tuna, shrimp, and shellfish.	1	2	3	4	5
38. Dried beans, such as split peas, lentils, red beans, and black-eyed peas.	1	2	3	4	5
39. Dairy products such as milk, cheese, and yogurt.	1	2	3	4	5
40. Eggs.	1	2	3	4	5
41. Fats, such as oil and butter.	1	2	3	4	5
42. Sweets, such as pie, cake, and cookies.	1	2	3	4	5
43. Fast foods such as Pizza Hut pizza, McDonald's hamburger, etc.	1	2	3	4	5
44. Snack foods such as potato chips, cheese puffs, and nachos	1	2	3	4	5

45. What is your sex?

- a) Male      b)Female

46. What is your age?

- a) 17 or under  
b) 18  
c) 19  
d) 20  
e) 21  
f) 22  
g) 23  
h) 24  
i) 25  
j) over 25

47. What is your classification?

- a) Freshman   b) Sophomore   c) Junior   d) Senior   e) Graduate

48. Please write your major/option/concentration directly above the "Important Directions For Marking Answers" box on the back of your scantron sheet. DO NOT WRITE in the space that says "DO NOT WRITE IN THIS SPACE."

Examples: Elementary Education/General Option/English Concentration  
Family and Consumer Sciences/Dietetics option

Make sure you have answered every question.

Thank you for your time!

## Appendix B

Primary Objectives

Identify factors college students perceive as barriers to achieving healthful eating.

Identify college students' misconceptions about diet and nutrition.

Secondary Objectives

Identify college students perceptions of the importance of healthful eating and regular exercise and physical activity.

Identify college students' perceptions of their personal efforts to achieve healthful eating and regular physical activity.

Investigate potential differences in perceived importance, personal efforts, misconceptions, and barriers between

a) male and female college students and between,

b) college students who eat at least half of their meals at on-campus dining services, and those who do not.

Survey items addressing objectives

Objectives	Survey items
<u>Primary objectives</u>	
Perceived barriers to achieving healthful eating	23-32
Misconceptions about diet and nutrition	12-19, 33-34
<u>Secondary objectives</u>	
Perceived importance of healthful eating and exercise and physical activity	8, 9
Perceptions of personal efforts to achieve healthful and regular exercise and physical activity	7, 10, 11, 20-22
Potential differences between males and females, and those who eat at least 61% of their meals in on-campus dining services and those who do not	1-3, 45



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