

THE RELATIONSHIP BETWEEN NUTRITION KNOWLEDGE AND DIETARY
HABITS OF FIRST AND SECOND-YEAR UNIVERSITY STUDENTS,
WITH OTHER LIFESTYLE FACTORS CONSIDERED

By

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The relationship between knowledge of nutritional concepts and the healthy behavior potentially resulting from this knowledge is not well understood. The purpose of this study was to further explore this relationship. Participants included forty-four first and second-year undergraduates enrolled at the University of Oregon. A ten-question quiz over basic nutrition concepts along with a thirty-question dietary behaviors questionnaire were administered. Subgroups of participants were analyzed in terms of their likelihood to target daily meals around the Food Guide Pyramid recommendations and their likelihood to use specific criteria when planning a meal. Participants were most likely to answer “sometimes” in regard to targeting meals around the Food Pyramid, and most likely to choose “taste” as their primary criteria when choosing a meal. Finally, participants’ quiz scores were correlated with their dietary background total. The findings revealed no relation between nutrition knowledge and dietary behavior.

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INTRODUCTION

Several studies have found that college students' diets are typically poor with regards to nutrient intake and calorie distribution (1-6). The reasons for these findings are unclear. Some researchers have suggested that the transition to college places students in a high stress environment and nutrition subsequently becomes a lower priority (2). Others believe it may be the result of a lack of nutrition knowledge (3,6). Whatever the reason, the risks of a poor diet are clear; chronic disease and higher mortality rates that could otherwise have been prevented. Because of this, it is important to determine the relationship between college students' nutrition knowledge and their dietary behaviors. It may be a lack of knowledge, poor dietary choices, or a combination of both that result in the typically inadequate diets of American college students.

The evidence is clear that nutrition and diet problems abound. Accompanying a lack of nutrition knowledge are poor dietary practices. Eating disorders and overzealous dieting are also common problems in the college aged population (3). Wanda Koszewski states that "Unhealthful eating behaviors remain predominant among young adults, especially those in college. The occurrence of bulimia has been estimated to be as high as 20% in college student populations, and symptoms of binge eating have been detected in up to 90% of college women" (5). Supporting this is the Roper College Track Report, an annual survey of student's attitudes and behaviors concerning eating habits. According to the report, "40 percent of students had crashed dieted in the last year (60%

of women surveyed and 25% of men)” (1). These findings are striking when one considers all of the available information on nutrition that exists and is available to the public. Still, the statistics about unhealthy diets continue to grow.

College students’ diets are poor in many aspects. A study by Patricia Brevard found that “Compared with the Recommended Dietary Allowances and national guidelines, subjects showed eating patterns that may predispose them to development of chronic disease later in life” (4). The broad range of potential diseases associated with a poor diet can result from either a lack of nutrients, or an overabundance of them. In Brevard’s study in particular, “For on-campus students, intakes of total fat, saturated fat, and monounsaturated fat were higher than recommended levels, and the ratio of polyunsaturated to saturated fat was lower than recommended” (4). These results can be considered somewhat alarming.

Findings such as these may or may not be responsible for a phenomenon known as the “Freshman Fifteen” (7). This is the amount of weight that many freshmen women supposedly gain during their first year of college. While it has been found that it does not occur to the majority of women (in the study, most women remained the same weight during the first six months of college), 34% of women had gained an average of 7.8 pounds by the end of their freshman year (7). Clearly, something detrimental is at work here, and poor diets may be playing a role. The next question then, is why are so many college students’ diets so poor? A lack of understanding of nutrition might be the answer.

How much do college students really know about nutrition? This has been an

important question on the minds of researchers. It appears that the average college student is not very educated on nutrition matters. Because of this, “Young adults tend to have misconceptions about nutrition, may fail to make nutrition a priority in food selection, and may be poorly informed about dietary guidance” (6). This lack of knowledge may be the result of the sources from which college students obtain their information. In a survey conducted by Ann Hertzler, nutrition information networks accessed by or accessible to college students were categorized into five types: The consumer market, media, family, authority, and teenage educational (8). Hertzler found that college women consuming low-fat foods gathered the most information from the consumer market and media networks. This is problematic, because experts know that low-fat foods are not always the healthiest choice. Hertzler’s study reveals the likelihood that many college students are receiving their nutrition information from questionable sources (i.e. potentially unreliable information networks). But assuming this were not the case, what else could be responsible for college students’ poor diets?

Many factors besides nutrition knowledge could help explain poor diets in the college student population. A study by Tanya Horacek revealed that “Students preferred food according to their taste, availability, convenience, budget and way of life” (9). Another finding was that “Students were not so much concerned and conscious about the health and nutrition qualities of their foods” (9). Clearly, this is evidence that students may not consider nutritional content to be a very important criterion when choosing their meals. In looking at the ways young adults view foods, Nancy M. Betts obtained results similar to Horacek’s. Betts found that “For students, importance of nutrition disappeared

as a perception while convenience emerged. For graduates, adequacy of money disappeared while importance of nutrition appeared as a strong perception. The non-students showed a fifth factor identifying satiety value of food as a strong perception while importance of nutrition disappeared” (10). Again, placing nutritional value as low in importance when choosing foods appears to be common among students. Assuming these students have a good nutritional understanding, then this finding is one possible explanation for why college students’ diets are so poor. However, many other theories exist.

College students have a tendency to eat out quite often. In a study examining the dietary status and eating out practices of college students, Hertzler concluded that “Compared with women, men were more likely to eat at fast-food restaurants.” Her findings also parallel other studies reporting the use of fast food because of easy access but not for food quality (11). It may be that college students are just too busy to shop for nutritious food items. However, whether or not college students are any busier than average adults (in the career world) has yet to be shown.

Beliefs about the importance of nutrition could also play a key role in dietary habits. In a study conducted by Constance C. Georgiou, “18-34 year olds reported believing less strongly in the diet-cancer connection and having less knowledge of National Cancer Institute dietary recommendations and of the composition of foods than older people. Persons aged 35 years and older considered nutrition to be more important than did young people” (12). Thus, it appears that negative beliefs about nutrition may also be responsible for the negative dietary behaviors commonly observed in college

students. Hertzler conducted another study that supports this notion about beliefs.

Hertzler's findings "Suggest that food choices and family dynamics can be considered to be directly related to one another. College students rated the family as their primary nutrition information source" (13). Apparently, beliefs held in families, or perhaps passed down from parents, can exert a strong influence on the dietary behaviors of college students. Yet, what happens to these beliefs once the student is away at college and no longer spending large amounts of time with or being influenced by the family? It could be the case that other factors come into play.

Some research suggests that the place of residence affects college students' dietary behaviors. In a study conducted by Kathy Beerman, comparing variations in the nutrient intake by students' residence, she found that "A student's residence not only affects food selection but also significantly influences nutrient intake" (14). Those students who lived on-campus had diets that were higher in saturated fat and cholesterol compared with students who lived off-campus (14). And, in a separate study conducted by Kathlyn E. Smiley, "Students described that many of the normal changes in adjusting to college create lifestyle behaviors that lead to feeling out of control," (15) such as living in the dormitories. Students also describe college food service to be partially responsible for such phenomena as the aforementioned freshman weight gain (15). Thus, the accessibility or availability of food may play a key role in dietary habits.

College students may develop dietary habits based on how accessible their food choices are. The annual survey by the Roper College Track Report reveals that "Students consume food that is low cost and readily available" (1). This can obviously lead to poor

dietary behaviors because food that is “low cost and readily available” can often be unhealthy, though admittedly this isn’t always the case. However, even if the food is nutritious, overeating can still become a problem (as was stated earlier). Noting the changing trends in students’ eating habits, Elizabeth A. Sloan comments that “University food courts provide quick services from food counters, and debit cards issued by universities provide easy payment opportunities for students” (16). Thus, having ready-made food and easy payment options can lead to negative dietary habits, including overeating, for college students. Now that numerous other factors potentially responsible for poor diets have been examined, it’s time to look at the possible ways to remedy the current situation.

Nutrition education may be one way to help college students improve their dietary habits. Jean D. Skinner believes that “College students are an appropriate target audience because their dietary practices are often poor and their lives are in transition” (2). This sentiment echoes earlier statements concerning poor dietary practices possibly resulting from hectic college schedules. Expanding on this concept, Sara Y. Cypel feels that college students “Have definite dietary beliefs, but the current challenge is to incorporate these concepts into practical educational materials” (6). If part of the reason college students’ diets are typically inadequate is due to a lack of time to plan healthy meals, then creating practical solutions would be a must.

Classes covering nutrition education could potentially benefit college students. However, different approaches have been taken in various classes nationwide, and which approach has been proven to work best? In a study conducted by Jill L. Neilson, it was

found that “Nutrition education that emphasizes the immediate pleasures of delicious, healthful foods will probably be more persuasive than that which focuses on future, vague hazards associated with the less-nutritious foods eaten” (17). This makes sense intuitively, as immediate pleasures and benefits are more easily recognized, and more practical to monitor as well. Neilson goes on to state that “The selection of messages in a nutrition education program should be considered carefully. The effectiveness of a program in changing behavior might depend on how motivating the target audience perceives the messages to be” (17). The results from her study suggest that nutrition messages that emphasize the sensory qualities of popular and nutritious foods are perceived as more motivating than factual messages about calories or other more technical aspects of nutrition. Messages that suggest specific alternatives for food choices or reinforce existing practices also appear to be motivating” (17). These are interesting observations to keep in mind when considering the design of a nutrition education course. There exist other nutrition factors that could be key components for such a course.

Teaching students how to target their daily meals around the Food Guide Pyramid could be a powerful tool. The Food Guide Pyramid was developed by the U.S. Department of Agriculture to assist people in making healthy dietary choices at every meal. A diet planned according to the Food Guide Pyramid is expected to meet the recommended dietary allowances for all nutrients, contain moderate amounts of fat and sugar, and provide an adequate amount of energy to maintain a healthy weight (18). It seems intuitive that teaching students to target their daily meals around the Pyramid

would help them achieve healthy dietary behaviors. This could be the case, however the Food Guide Pyramid is not perfect. Although it has many strengths, there is still a need to improve its usefulness as a nutrition education tool (18). For now though, it contains some dietary guidelines that are most likely worth shooting for.

Another potentially important component in a nutrition course would be teaching students about the Nutrition Labeling Education Act. The NLEA was passed in 1990 to assist consumers in making more informed buying decisions. A study by Joanne F. Guthrie revealed that label use appears to be associated with the consumption of diets that are higher in Vitamin C and lower in cholesterol (19). Labels that are easier in format to read allow the consumer to identify nutrition information readily and easily. A study conducted by Anne B. Marietta found that students' nutrition label knowledge scores were positively correlated with attitudes toward labels ($R = .14$, $P = .04$) and use of labels ($R = .87$, $P = .0001$). Previous education in reading labels was also associated with higher nutritional knowledge scores ($P = .04$) (20). This is important because it is evidence that the more students know about the nutrition labels on food, the more likely they are to use those labels (and to use them well) when choosing foods for a meal. Another promising finding from Marietta's study was that 95% of participants perceived the label to be useful, along with 70% who said that they looked at the nutrition facts label when purchasing a food product for the first time (20). In sum, labeling education efforts are associated with greater knowledge about labels, more favorable attitudes toward them, and increased label use in making food choices (20).

Another useful notion is the concept of "tailor-fitting" nutrition education

approaches to individual lifestyles. People choose what to eat for many different reasons, and the idea of custom crafted dietary strategies has the potential to be quite useful.

Georgiou supports this notion. Her study revealed that health promotion efforts could be enhanced by identifying demographic, educational, situational, and formative influences on positive health and dietary behaviors of young adults (12). Recognizing and understanding these various influences can allow nutrition educators to better meet the needs of college students' diverse lifestyles, especially with regards to food. Skinner agrees with this train of thought as well. His study contained behavior change steps (awareness, development of receptive attitudes, trial, reinforcement, and adoption) that are one approach to skill development. And, equally important it seems, is the personalization of learning to match the student's current needs and problems (2). Considering all of the potential options for improving college students' dietary behaviors, it's time to ask the big question: What is the relationship between nutrition knowledge and dietary habits?

Current research doesn't reveal a strong relationship between nutrition knowledge and corresponding habits. While a survey conducted by "Health Focus" of Emmaus, PA, found that nine in ten American shoppers are thinking about their health when they choose foods (21), the real point of interest is what the shoppers ultimately decide. Do they consider their nutritional health with each food they look at, and then choose what is in their best interest for long-term quality of life? Or, do they consider their nutritional health, and then choose the food that has less nutritional value? These are two very important questions to ask. If shoppers do the former, than it could be said that their

nutrition knowledge is exerting positive influences on their dietary behaviors. However, if it is the latter, it would seem that their nutrition knowledge was not exerting a positive effect on their dietary behaviors. A study conducted by Michael L. Trexler supports this latter notion. The study found that when knowledge of four dietary factors (cholesterol, saturated fat, total fat, and sodium) associated with cardiovascular disease (CVD) were assessed and compared with cardiovascular diet quality (a measure of the consumption of cholesterol, saturated fat, total fat, and sodium), that there were no significant relationships between knowledge scores and CVD diet quality found (22). This is clear evidence that prior nutrition knowledge did not exert a positive effect on dietary behaviors.

There is further evidence to support no existing relationship between nutrition knowledge and dietary behaviors. Stella C. Delonero found that previous health instruction had no effect on a nutrition inventory for measuring nutrition value preferences of high school and college students (23). This finding supports Delonero's notion that "Eating practices have commonly been viewed as a phenomenon unrelated to general [nutritional] values" (23). The study by Horacek mentioned earlier supports the existence of no relationship as well. Her findings revealed that only 26% of subjects were motivated by health and weight and exhibited dietary intakes consistent with their beliefs. Conversely, the students least motivated by health, had high fat intakes coupled with low nutrient intakes, putting them at greater risk for chronic disease (9). These pieces of evidence seem to provide a bleak outlook for the future of effective nutrition education. However, some evidence does suggest a relationship between nutrition

knowledge and dietary behavior.

The relationship between nutrition knowledge and dietary behaviors may exist. Sandra J. Mitchell examined the changes that took place after students completed a basic college nutrition course, and the results were rather promising. A post-class survey indicated that students had learned a “large” amount of useful information, and that 45% had acted upon this information by incorporating it into their daily lifestyles (24). Some changes after completing the course included: An increase in confidence in adequacy of student diets, a decrease in supplement use, and reduced fat content of milk usually consumed (24). A very important question however, and one for which this study cannot provide an answer, is how long did these effects take place after the basic college nutrition course had ended? In other words, were the dietary behaviors short-lived, or did they stay firmly rooted in those who had restructured their typical eating routines? This is the crux of nutrition education--knowing how soon dietary habits can be restructured through knowledge, and determining the best methods to ensure that the new (healthier) habits last. Skinner’s study sheds some excellent light on this. He asks, “If needed behavior changes do not occur during the instruction period, how likely is it that behavior change will occur spontaneously at a later time?” (2). He then answers himself, stating that it “Appears that the behavior change process must at least begin during the instruction period, with the hope that it will continue beyond enrollment in the class” (2). If these two conditions can be met, perhaps nutrition knowledge will become capable of exerting a positive effect on dietary behaviors.

This study seeks to explore whether or not previous nutrition knowledge exerts a

positive effect on dietary habits. The studies previously discussed have shown that for the most part, there exists no relationship, except perhaps in the short-run. The aim of this study is precisely to determine if nutrition knowledge retained and capable of exerting an influence on dietary choices, will do just that; be used as a resource for healthful dietary habits.

METHODS

Forty-four freshman and sophomore students (thirty-two females and twelve males) from the University of Oregon participated. Participants were recruited with a brief explanatory speech about the study during either their freshman seminar class, or during their once-a-term work meeting. Participants signed consent release forms and agreed to answer all questions as honestly as possible. Participants first took a ten-question quiz (please see attached copy) over basic nutritional concepts. The quiz was published in “American Health” magazine as a useful way for readers to test their nutrition IQ. Participants then answered a thirty-question dietary habits background questionnaire (please see attached copy), designed by the researcher to measure the health value of their typical eating routines. The questionnaire was similar in style on many questions to a semi-quantitative food frequency questionnaire. Food frequency questionnaires have been shown to be accurate and useful (25-27).

Statistical analysis was used on both the quiz scores and questionnaires. The mean and standard deviation was calculated for the quiz scores. Percentage of subgroups (male/female, on-campus housing/off-campus, first-year/second-year, and healthy BMI (body mass index)/unhealthy BMI) were determined according to their likelihood to target their daily meals around the Food Guide Pyramid (answer choices included: always, often, sometimes, rarely and never). These subgroups were also analyzed in terms of their likelihood to view a specific criteria (price, taste, nutritional value, name

brand, and convenience) as most important when evaluating food for a meal. BMI (body mass index) was determined by dividing weight by height squared (kg/m^2) and consulting the ACSM (American College of Sports Medicine) guidelines for what constitutes a healthy ($> 17 \text{ kg/m}^2$ and $< 25 \text{ kg/m}^2$) BMI range (both height and weight were self-reported by subjects). Finally, the quiz scores and total dietary habits background scores were correlated using the student's t-test and Pearson product moment correlation coefficient calculations. Participants' data were coded to ensure confidentiality and entered into database using Microsoft Excel. Graphs were created using Microsoft Excel as well.

DATA ANALYSIS

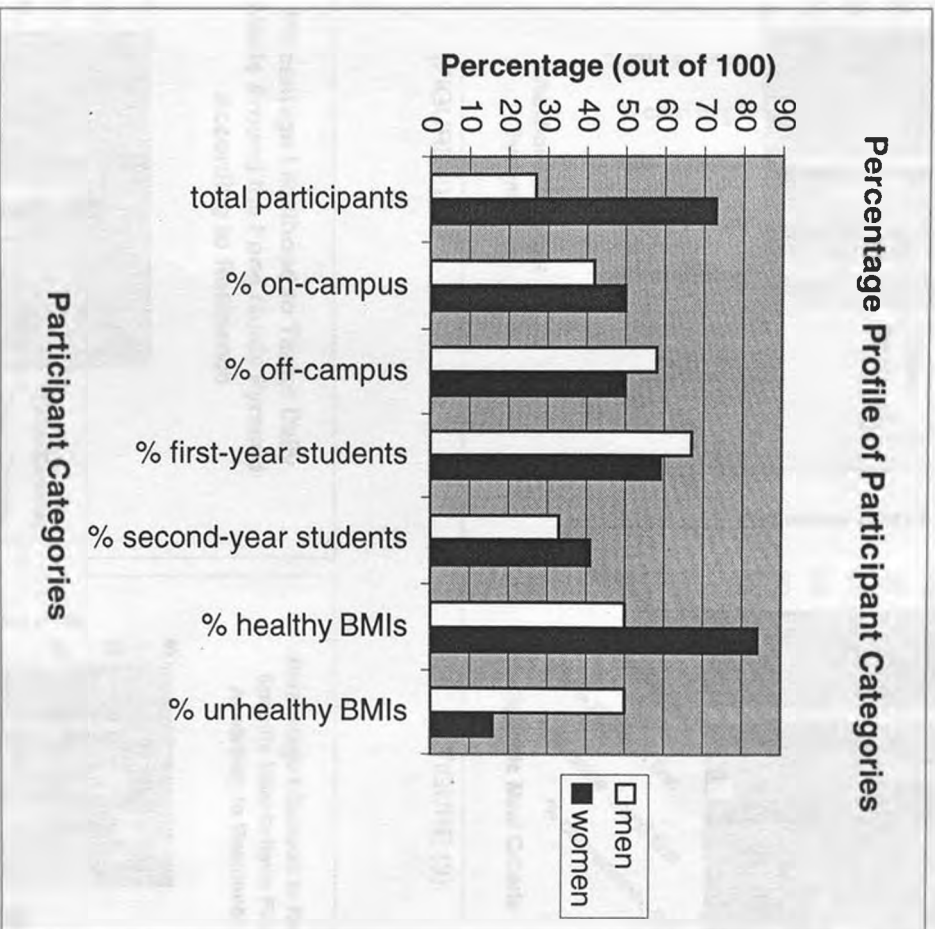
Descriptive statistics revealed some interesting findings (percentage breakdowns of each subgroup are provided in figure 1). Through the creation of histogram bar graphs (frequency plots), each participant subgroup could be analyzed in terms of its likelihood to target daily meals around the Food Guide Pyramid, and likelihood to view specific criteria as most important when choosing food for a meal.

Regardless of which particular subgroup each student was categorized in, the histogram analysis results were roughly the same (figures 2-9). In regards to targeting daily meals according to the Food Guide Pyramid, 42% of males and 47% of women chose “sometimes.” This was the most frequently chosen option for women, while 50% of men chose “never.” On-campus and off-campus students chose “sometimes” 43% and 48%, respectively, with “sometimes” being the most frequently chosen option for both groups of students. 44% and 47% of first-year and second-year students respectively, chose “sometimes.” Again, this option was the most frequently chosen by both groups. And for students with healthy and unhealthy BMIs, 42% of healthy BMIs and 55% of unhealthy BMIs chose “sometimes.” Once again, this was the most frequently chosen option for both groups. Figures 2-9 illustrate the percentage breakdowns for each subgroup.

Results were similar in respect to each subgroup’s likelihood to view specific criteria as most important when evaluating food for a meal as well. 67% of men and 44% of women chose “taste” as their most important criteria, making “taste” the most

frequently chosen option by both sexes. “Taste” was also the most frequently chosen option for all other subgroups as well. On-campus students and off-campus students chose “taste” 52% and 48% of the time, respectively. 44% of first-year and 59% of second-year students, along with 52% of students with healthy BMIs and 45% of students with unhealthy BMIs all chose “taste” most frequently. Again, figures 2-9 illustrate the percentage breakdowns for each subgroup.

Quiz scores and dietary habit questionnaire scores were analyzed next. The mean and standard deviation for all participants’ quiz scores were 5.93 +/- 1.16. Quiz scores were out of ten possible points. Next, scores were calculated for each participant’s background dietary habits (with fifty points being the possible total). Scores on ten specific questions (11b, 13, 18, 19, 22, 23, 24, 25, 27, and 28) were totaled and entered into database form. Using an XY scatter plot in Excel, individual quiz scores (X-axis) were plotted against individual “dietary health” score totals from the ten questionnaire questions (Y-axis). Next, using the student’s t-test and Pearson’s product moment correlation coefficient calculations, a line was best fit to the data. Calculations revealed that the standardized coefficient (R) had a value of -.207, while Pearson’s correlation coefficient (P) had a value of .178. From these findings, it can be said that this study found there to be no relation between nutrition knowledge and dietary habits.



(FIGURE 1).

**Likelihood to Target Daily Meals
Around the Food Guide Pyramid
According to Sex**



(FIGURE 2).

**Percentage Likelihood to Rank Specific
Meal Criteria Most Important According
to Sex**

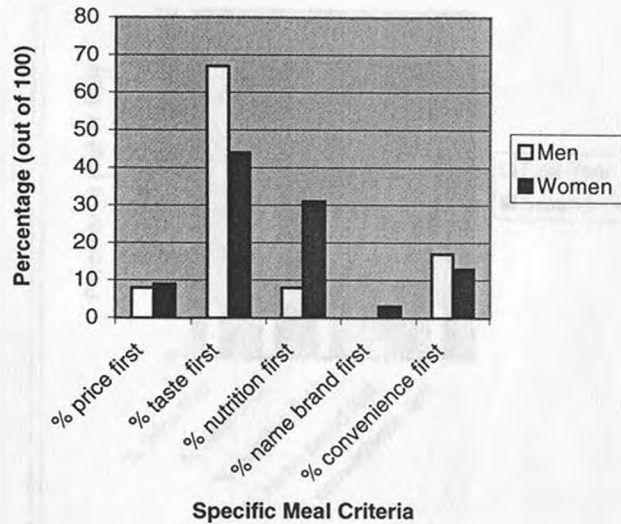
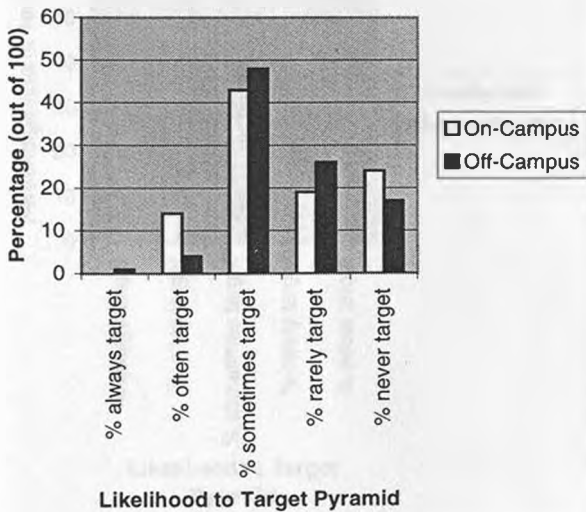


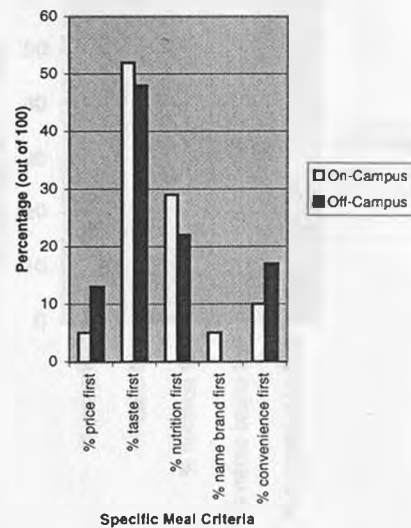
FIGURE (3).

**Percentage Likelihood to Target Daily
Meals Around the Food Guide Pyramid
According to Residence**



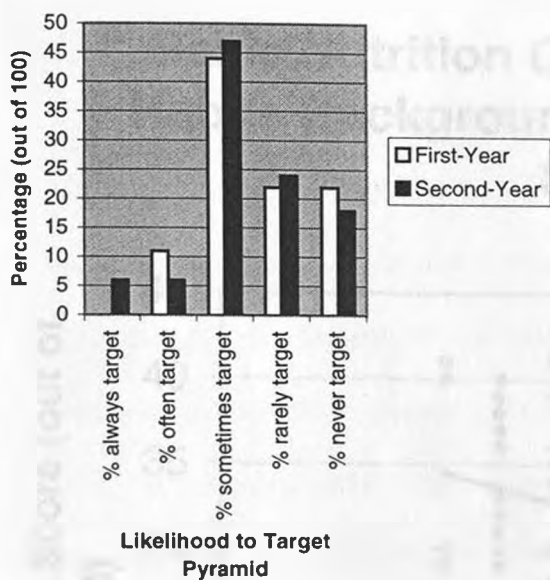
(FIGURE 4).

**Percentage Likelihood to Rank
Specific Meal Criteria First
According to Residence**



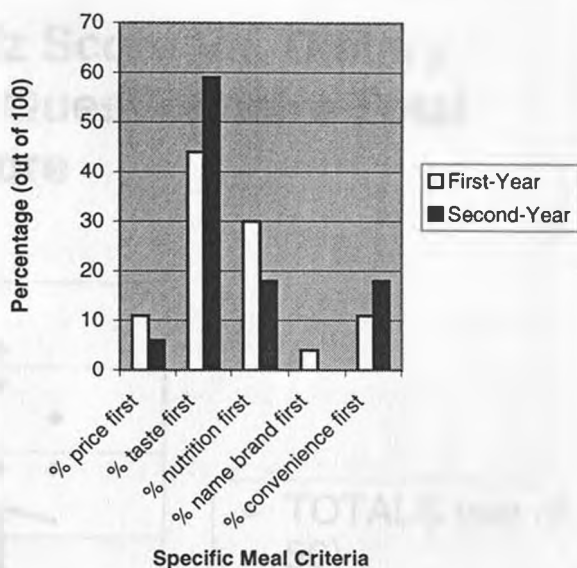
(FIGURE 5).

Percentage Likelihood to Target Daily Meals Around the Food Guide Pyramid According to Year in School



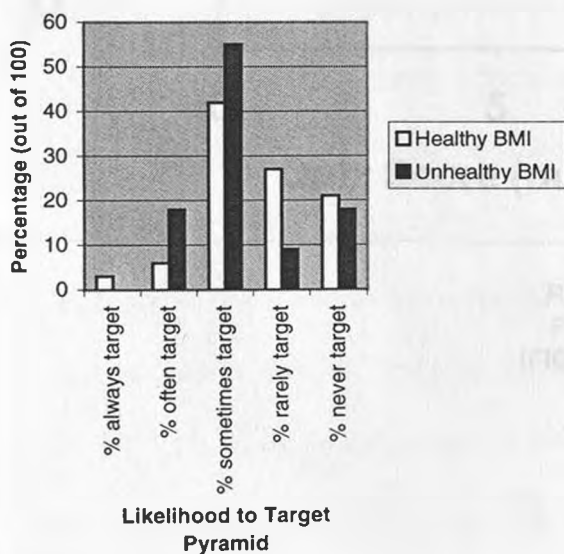
(FIGURE 6).

Percentage Likelihood to Rank Specific Meal Criteria First According to Year in School



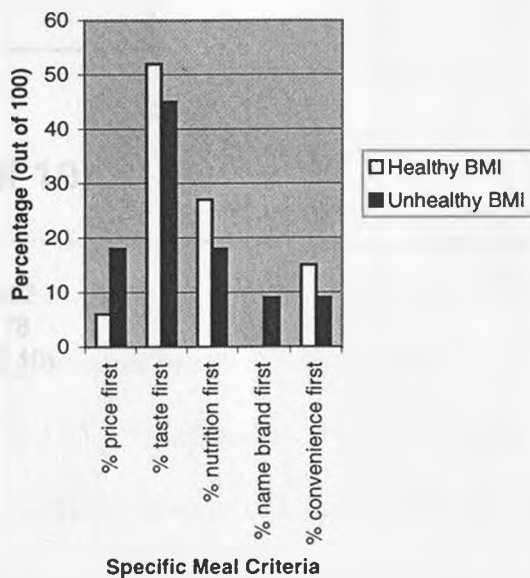
(FIGURE 7).

Percentage Likelihood to Target Daily Meals Around the Food Guide Pyramid According to Body Mass Index



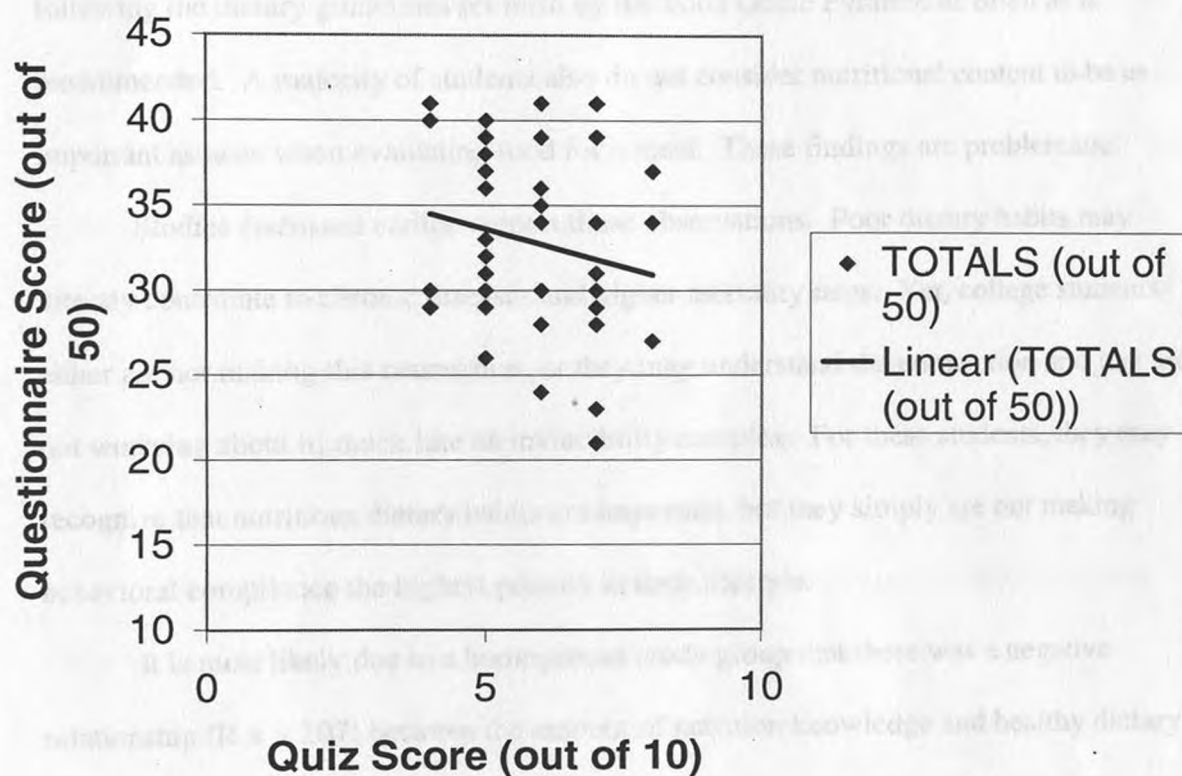
(FIGURE 8).

Percentage Likelihood to Rank Specific Meal Criteria First According to Body Mass Index



(FIGURE 9).

Basic Nutrition Quiz Score Vs. Dietary Habits Background Questionnaire Total Score



$R = -.207$
 $P = .178$
 (FIGURE 10).

CONCLUSION

From this study it is clear that nutrition may not be a top priority for first and second-year students at the University of Oregon. The majority of students are not following the dietary guidelines set forth by the Food Guide Pyramid as often as is recommended. A majority of students also do not consider nutritional content to be as important as taste when evaluating food for a meal. These findings are problematic.

Studies discussed earlier support these observations. Poor dietary habits may directly contribute to chronic diseases and higher mortality rates. Yet, college students either are not making this connection, or they may understand the connection and just are not worrying about it; much like an invincibility complex. For these students, they may recognize that nutritious dietary habits are important, but they simply are not making behavioral compliance the highest priority in their lifestyle.

It is most likely due to a homogenous study group that there was a negative relationship ($R = -.207$) between the amount of nutrition knowledge and healthy dietary behaviors. No research could be found to support the idea that dietary habits worsen with an increase in nutrition knowledge. Still, as discussed earlier there may be many factors responsible for these findings, including the methodology specific to this study.

This study had potential limitations that must be addressed. First, and perhaps most important of all, the sample size was admittedly quite small. Many recent studies have looked at populations of hundreds of students, whereas the sample size for this study was just forty-four students. It is difficult to make strong assumptions or

generalizations about a large population (i.e. first and second-year university students) with a small sample size. Second, neither the quiz nor the questionnaire were rigorously tested nor scrutinized for validity through the use of pilot studies before being administered to participants. While the quiz had been used in a respectable health journal, it had not been drafted with the help of focus groups or committees. This could have allowed for overly arbitrary questions, or questions with poor wording to remain in use. The dietary habits questionnaire was designed entirely by the author, and scrutinized by the faculty advisor, however it had not been rigorously tested or examined for validity in a pilot study of any sort before being administered to participants. These limitations could have combined with other more minor limitations to produce poor results.

Some other minor limitations are worth mentioning here. First, there may have been too few questions on the basic nutrition concepts quiz. More questions may have allowed for a better assessment of nutrition knowledge. Second, participants were not tested on their knowledge of the Food Guide Pyramid principles, but rather on their awareness of the existence of these principles. Had their specific knowledge of these principles been assessed, it may have been possible to get a much clearer understanding of just how much they really knew. And finally, concerning Body Mass Index data, the heights and weights of each participant were not measured by the researcher, but rather they were self-reported by the participants. This can lead to errors in calculating BMI and can make it problematic to consider this variable when examining the relationships between nutrition knowledge and bodily health. Aside from these limitations, the remaining methodologies and statistical analyses were standard compared with other

current research in the field.

Assuming the potential limitations exerted a small effect on the findings of this study, what can now be said about the relationship between nutrition knowledge and dietary habits? From this study, as stated earlier, it would appear that there is no relationship. Previous studies have supported these findings, however these studies most likely had some limitations as well. Future researchers will have to design studies to accurately assess the stored nutrition knowledge readily available to participants (and thus capable of exerting an influence on food choices). Researchers will also need to design highly accurate ways to assess the daily, consistent dietary behaviors of participants, perhaps with monitoring sessions of extended duration. Whatever the innovations, it will benefit not just college students but lay people in general to better understand the link between what they know about nutrition, and how closely they act according to this knowledge.

THESIS QUIZ QUESTIONS
(Nutritional Aptitude Test)

Instructions: CIRCLE THE CORRECT ANSWERS

QUESTIONS:

1. Saturated fat is found only in animal products. TRUE FALSE
2. Synthetic vitamin C supplements are as effective as "natural" vitamin C supplements. TRUE FALSE
3. Red meat, poultry and fish are good sources of protein. TRUE FALSE
4. Which of the following contains the most fat? (a) One tablespoon of peanut butter (b) 1/4 cup of sunflower seeds (c) Five shortbread cookies
5. Which of the following contains the most calcium? (a) One cup of lowfat (1% fat) cottage cheese (b) One cup of skim milk (c) One cup of plain lowfat yogurt
6. Which of the following contains the type of iron that is most efficiently absorbed by the body? (a) Iron-fortified cereal (b) Steak (c) Tofu
7. It's harmless to take large doses of vitamin C. TRUE FALSE
8. Cholesterol-free foods are always fat-free. TRUE FALSE
9. Excessive sugar consumption can lead to diabetes. TRUE FALSE
10. An apple and a slice of whole wheat bread are both good sources of fiber.
TRUE FALSE

ANSWERS:

1. False. Animal foods are the primary source of saturated fats, but they aren't the only source. Saturated fat is also found in products made with coconut oil, palm kernel oil and palm oil.
2. True. Vitamin C chemically synthesized in a laboratory has the same chemical structure as vitamin C extracted from a plant. The body cannot tell the difference between the two forms.
3. True. Poultry and fish, however, are generally leaner than red meat, so they may be wiser choices.
4. (b). Sunflower seeds top the list with about 15 grams in a 1/4-cup serving. Five shortbread cookies have about 11 1/2 grams of fat, and one tablespoon of peanut butter contains about eight grams of fat. Sunflower seeds and peanut butter are, however, more nutritious than shortbread cookies.
5. (c). One cup of plain lowfat yogurt averages about 415 milligrams of calcium, which is 42% of the U.S. Recommended Daily Allowance (U.S. RDA) for adult men and women (1,000 milligrams). One cup of skim milk contains some 302 milligrams, or 30% of the U.S. RDA. Lowfat (1% fat) cottage cheese is not as good a source of calcium as most other cheeses: One cup contains about 138 milligrams, or 14% of the U.S. RDA.
6. (b). Animal foods contain a form of iron that is more readily absorbed than the form of iron found in cereals, grains and vegetables. But iron absorption from nonmeat foods is greatly increased when they're served with meat, fish or poultry. Vitamin C, from a glass of orange juice or a lemon squeezed on the food, also enhances iron absorption from nonmeat foods.
7. False. Reports of possible harmful effects of megadosing, such as interfering with the absorption of other nutrients, suggest it's unwise to consume very large amounts of vitamin C (more than 1,000 milligrams a day) or any other nutrient.
8. False. All plant-based foods are cholesterol-free (only animal foods contain cholesterol), but some contain fat. For example, meatless tomato sauce made with olive oil has no cholesterol, but it does contain some fat (from the oil).
9. False. Sugar does not contribute to the development of diabetes, but it aggravates the condition once it exists.
10. True. They both have about three grams of fiber, but an apple has more soluble fiber, which may help reduce cholesterol, while a slice of whole wheat bread has more insoluble fiber, which may or may not help reduce colon cancer.

PERSONAL BACKGROUND AND DIETARY HABITS QUESTIONNAIRE

1. Age_____ 2. Sex_____ 3. Height (in inches)_____ 4. Weight (in pounds)_____
5. Proposed major of Study_____
6. Is this your first year or second year attending a university? ☐ First ☐ Second
7. Do you live on-campus or off? ☐ On ☐ Off
8. Have you ever taken a nutrition course? ☐ Yes ☐ No If yes, please list the date(s) and for what duration_____
9. How would you rate your knowledge of nutrition? ☐ Very Strong ☐ Strong
☐ Average ☐ Poor ☐ Very Poor
10. Do you believe yourself to be a generally health-conscious person? ☐ Yes ☐ No
11. Are you aware of the Food Guide Pyramid and the recommendations it sets forth for a healthy diet? ☐ Yes ☐ No If yes, how often do you target your daily meals around these recommendations? ☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never
12. Please rank the following five criteria numerically from most important to least important (with 1 being the most important) when typically choosing food for a meal:
Price_____ Taste_____ Nutritional Content_____ Name Brand_____ Convenience_____
Do you consider any of the above variables to be useless when choosing food for a meal? ☐ Yes ☐ No If yes, Please list which variables_____
13. How often do you read the nutrition labels on the foods you consume? ☐ Always
☐ Often ☐ Sometimes ☐ Rarely ☐ Never
14. How often do you keep track of the number of calories you consume in a meal?
☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never
The number of calories you consume in a day? ☐ Always ☐ Often ☐ Sometimes
☐ Rarely ☐ Never
15. Are you currently involved in any type of exercise program? ☐ Yes ☐ No If yes, please list how often you exercise and for what duration_____
16. How often do you keep track of the number of calories you burn during exercise and other physical activities? ☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never
17. Throughout the day, do you typically eat a few large meals, or many small meals?
☐ A Few Large Meals ☐ Many Small Meals

18. How many times in the last year have you restricted your caloric intake for any period of time on a daily basis (i.e., "gone on a diet")? ☐ None ☐ Once ☐ Twice ☐ Three Times ☐ Four Times or More
19. How often do you give into food cravings even when you are aware that the food item is potentially unhealthy for you? ☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never
How often do you eat foods that you know are potentially unhealthy for you? ☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never
20. Do you ever find yourself eating even when you are not really hungry (i.e., do you ever eat just to keep busy or "pass the time")? ☐ Yes ☐ No
21. How often do you have concerns when you are aware that the meal you are eating is considered to be potentially unhealthy according to standard knowledge? ☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never
22. How often do you skip breakfast? ☐ Never ☐ Once a Week ☐ Twice a Week ☐ Three Times a Week ☐ Four Times or More a Week
23. How often do you eat after 9pm or just before going to sleep for the night (i.e., have a "midnight snack")? ☐ Never ☐ Once a Week ☐ Twice a Week ☐ Three Times a Week ☐ Four Times or More a Week
24. How often do you eat meals when rushed or preoccupied with other activities (e.g., while working, driving, walking, studying)? ☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never
How often do you set aside time solely for meals? ☐ Always ☐ Often ☐ Sometimes ☐ Rarely ☐ Never
25. How often do you eat "fast food"? ☐ Never ☐ Once a Week ☐ Twice a Week ☐ Three Times a Week ☐ Four Times or More a Week
26. (For on-campus students) How often do you eat in on-campus cafeterias? ☐ Never ☐ Once a Day ☐ Twice a Day ☐ Three Times a Day ☐ Four Times or More a day
27. How often to do you smoke cigarettes? ☐ Never ☐ Half a Pack or Less per Day ☐ A Pack or Less per Day ☐ Two Packs or Less per Day ☐ More Than Two Packs per Day
28. How often do you drink coffee? ☐ Never ☐ One Cup a Day ☐ Two Cups a Day ☐ Three Cups a Day ☐ Four Cups or More a Day
29. Do you take any dietary supplements or nutritionally based performance enhancers (the type that could be purchased in a health food store)? ☐ Yes ☐ No
If yes, please list what types and how many per day _____
-
30. How often were you sick or have the "flu" in the last year? ☐ None ☐ Once ☐ Twice ☐ Three Times ☐ Four Times or More

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