

REASONS FOR IMPROVEMENTS IN COOKING AND DIETARY HABITS BETWEEN
UNDERGRADUATE NUTRITIONAL SCIENCES COLLEGE STUDENTS AND NON-
NUTRITIONAL SCIENCES COLLEGE STUDENTS

By

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ABSTRACT

Background: Research shows that cooking meals improves diet quality. However, there is limited evidence that undergraduate students in nutrition or dietetics programs cook more meals while they are learning about foods and its impacts on human health.

Methods: An 11-question survey was completed by 238 nutritional science majors (majors) and 91 non-nutritional science majors (non-majors). They were asked about several things, most notably the frequency of cooking meals, eating fast-food, and fruit and vegetable consumption.

Results: Majors cooked meals more often than non-majors ($p=0.059$). When comparing the students in freshman and senior majors, senior majors cooked meals more often than freshman majors ($p=0.023$). The students who reported living in apartments, houses, or condos, or with parents, relatives, or spouses cooked more meals than students living in dorms ($p=0.006$). Majors consumed significantly less fast-foods than non-majors ($p=0.022$). Majors ate more fruits and vegetables than non-majors ($p=0.005$, $p=0.025$).

Conclusions: This study suggests that nutrition-related education may have a positive impact on decreasing the frequency of fast food consumption, increasing the consumption of fruits and vegetables, and increasing the number of meals that are cooked.

INTRODUCTION

Research on cooking has shown benefits to health. Cooking meals at home has been associated with increased diet quality.^[1] This is also true for specific populations, such as young adults.^[2] It has also been seen that college students tend to have healthier habits and food choices than non-students.^[3] This may be due to their increased education level. However, adults, including college students, can face barriers to cooking, such as a lack of time or affordability, among others.^[4] Education, specifically nutrition-related education, may or may not affect the cooking and dietary habits of college students, especially as they advance with each academic year.

Studies have been done in regards to college students' eating behaviors, but few have looked at the eating behaviors of nutritional sciences majors in particular – and when they do, it is mostly on the prevalence of eating disorders, and were conducted greater than 10 years ago.^{[5]-[8]} Of those, none have looked specifically at time spent cooking or what students were doing during that time (microwaving, chopping, etc). They also fail to compare this information through and between freshman, sophomores, juniors, and seniors, which all have very different levels of knowledge about food, health, and cooking.^[9]

Nutritional science majors begin to learn about nutrition and health related information with growing intensity as they progress through their undergraduate studies. The freshmen start out with a basic class about nutrition, covering fundamental information about vitamins, minerals, their deficiencies and toxicities, food groups, and portion sizes. The freshman and sophomore years of college are generally a time for taking required courses in humanities, English, math, and, for nutrition majors, biology and chemistry. Once the nutrition student reaches junior year, the amount of knowledge they are taught about nutrition begins to increase greatly. The junior can be expected to know about how nutrition affects contraception, fertility, pregnancy, infancy, childhood, adolescence, adulthood, the elderly, as well as how to cook food, how food is digested, stored, and utilized by the body for energy and for other metabolic processes. Senior nutritional science students know all this as well as how nutrition affects diseases such as obesity, cardiovascular disease, liver disease, kidney disease, diabetes, and others. Nutritional science students of all levels can be expected to know that nutrition can contribute to disease risk. For example, that excess calorie consumption leads to obesity, which is a risk factor for certain cancers, cardiovascular disease, type 2 diabetes mellitus, and more. As students progress from freshmen to sophomores, sophomores to juniors, and juniors to seniors, their knowledge only solidifies and their understanding of all the inter-related factors of nutrition and disease grows.

Knowing whether or not nutrition major's cooking and eating behaviors improve as they progress through college could provide evidence for the increased merit of nutrition education based programs in altering food-related behaviors.

OBJECTIVES

The objective of this research project is to attempt to answer the following research question:

As students in the nutritional sciences department progress through their coursework with the advancement of each undergraduate year, do they spend more time cooking their meals, and less time preparing them, or eating fast food?

Combined with preliminary research, this leads to the following research hypothesis:

As students in the nutritional sciences department progress through their coursework with the advancement of each undergraduate year, they spend more time cooking their meals and less time preparing them or eating fast food due to increased knowledge and experience with cooking and its health benefits.

METHODS

For the purposes of this research project, 'cooking' was defined as meal-preparation related activities including washing, chopping, mixing ingredients, roasting, seasoning, etc. 'Preparing', 'simple preparation', 'prepared by simple means' or similar terms will be used to refer to activities in the realm of simple meal preparation, such as microwaving frozen meals, adding boiling water to cup noodles or ramen noodles, or making a simple peanut butter and jelly sandwich. 'Fast food' will refer to consumption of any meal purchased or received ready for immediate consumption. The term "majors" will be used to refer to nutritional science majors and "non-majors" will refer to students from the control who are not nutritional science majors or any health-related major.

Survey

Participants

Students were recruited to take the survey by their professors, which were contacted by email for permission to use class time to survey the students. Students enrolled in a major from the nutritional sciences department, which includes nutrition students of either the dietetics or nutrition option, were surveyed as the population of interest. Students from majors that are not closely related to a health sciences field (biology, physiology, public health, etc) such as engineering, math, and geology were surveyed as a control. Students listened to a brief oral consent form before taking the survey. Surveys were collected from September through December of 2015.

Survey Questions

The survey (Appendix 1) starts by asking students 6 basic demographic questions, including age, gender, ethnicity, major location, year in college, and living situation. Question 7 asks students how many times per week they purchase or consume ready-to-eat foods which required no preparation on their part. The purpose of this question was to determine the frequency of students' "fast food" consumption. Question 8 asks students to fill out a chart containing a spot for each

meal of the week, and to put an X for each meal that was prepared with simple measures. Question 9 has the same design, but asks students to mark which meals they cooked. These questions seek to determine the frequency students prepare or cook meals. Question 10 asks about which, if any, of certain common dieting styles the student follows. Questions 11-16 inquire about student's frequency of consuming 6 defined food groups (fruits, vegetables, dairy, protein, grains, and olives/nuts/seeds). All survey questions after 17 were part of another project and are not analyzed in this paper.

Responses were kept anonymous and transferred by hand to excel sheets for data analysis. Data was analyzed by multiple linear regression and descriptive statistics.

Survey Questions:

1. What is your age?
2. What is your gender?
 - a. Female
 - b. Male
3. What is your ethnicity?
 - a. White
 - b. Hispanic or Latino
 - c. Black or African American
 - d. Native American or American Indian
 - e. Asian / Pacific Islander
 - f. Other: _____
4. What is your academic status within your major?
 - a. Freshman
 - b. Sophomore
 - c. Junior
 - d. Senior
5. What is your major and emphasis, if applicable (i.e. Nutrition major with dietetics emphasis, or nutrition major with nutrition emphasis)? Otherwise check "Undecided".
Major: _____ Undecided
Emphasis: _____ Undecided/None
6. Which of the following best describes your living situation?
 - a. Dorm
 - b. Apartment, house, condo, etc.
 - c. With parents/relatives/spouse
 - d. Other: _____

7. Approximately how many **times per week** do you purchase and/or consume ready-to-eat food requiring **no** preparation on your part, for **immediate consumption**? Examples of where this can occur may include:

- The student union
- McDonald's
- Taco Shop
- Jack in the Box
- Paradise Bakery
- A food truck or stand
- Any restaurant or fast food establishment

I perform this type of activity about _____ times per week.

8. The chart below is a representation of each meal you consume every day per week on a **usual** basis (over the past month or so). Place an X in the corresponding box for each meal you usually prepare in one of the following ways:

- Microwaving frozen, refrigerated, or canned food
- Boiling noodles (ramen, macaroni, etc)
- Reheating leftover food that you did not originally prepare
- Otherwise making the final preparations to food that has mostly been pre-prepared or does not require much difficulty, such as:
 - Making a peanut butter and jelly sandwich
 - Pouring milk into a bowl full of cereal
 - Rehydrating potato flakes instead of mashing potatoes by hand

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Breakfast							
Lunch							
Dinner							

9. The chart below is a representation of each meal you consume every day per week on a **usual** basis (over the past month or so). Place an X in the corresponding box for each meal you usually prepare in one of the following ways:

- Washing/peeling
- Chopping (dicing, mincing, julienning, etc)
- Mixing/stirring
- Seasoning (basting, preparing a marinade, etc)
- Sautéing/stir-frying/grilling
- Otherwise **actively** engaging in cooking food (**Do not** include time spent watching TV while bread is baking)

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Breakfast							
Lunch							
Dinner							

10. Check all that apply to your dietary habits.

- Vegetarian (no meat)
- Pescetarian (no meat except fish)
- Lacto-Vegetarian (no meat or eggs, but dairy allowed)
- Ovo-Vegetarian (no meat or dairy, but eggs allowed)
- Lacto-Ovo-Vegetarian (no meat, dairy and eggs allowed)
- Vegan (no animal flesh or products - i.e. no milk, honey, eggs, dairy, meat, fish, etc.)
- Gluten Free
- Paleo (centered around foods available to human ancestors - nuts, berries, meat, etc.)
- I do not consume red meat
- I do not consume dairy products
- None of these apply to me

Use the table below to help you answer questions 11-16.

11. How many servings of vegetables do you consume per day? Circle a value below.
0 1 2 3 4 5+
12. How many servings of fruit do you consume per day? Circle a value below.
0 1 2 3 4 5+
13. How many servings of grains do you consume per day? Circle a value below.
0 1 2 3 4 5+
14. How many servings of protein do you consume per day? Circle a value below.
0 1 2 3 4 5+
15. How many servings of dairy do you consume per day? Circle a value below.
0 1 2 3 4 5+
16. How many servings of olives, nuts, or seeds do you consume per day? Circle a value below.
0 1 2 3 4 5+

Serving Size Examples

Vegetables	Fruit	Grains	Protein	Dairy	Olives, nuts, seeds
1 cup, chopped	1 cup, chopped 1 fruit (orange, apple)	½ bagel ½ cup cooked rice/ pasta 3 cups popcorn 1 slice bread	1 ounce meat 1 egg ¼ cup cooked beans	1 cup milk, yogurt, frozen yogurt 1 ½ oz hard cheese	1 tbsp Peanut Butter ½ ounce nuts (12 almonds)

Focus Groups

Participants

Students were recruited by emailing professors and asking for a brief period of class time to announce the opportunity to participate in a focus group. Only professors teaching classes to senior students in the nutritional science department were contacted. Students were offered a marginal amount of extra credit points by one professor for attendance to the focus group. Each focus group contained an interviewer for asking the questions and a transcriber for transcribing the data. At the beginning of each focus group, a brief oral consent form was read to the participants.

Questions

The focus groups consisted of 8 open-ended questions (Appendix 2) about current eating and cooking behavior, if any of these behaviors have changed since freshman year, and why. All other focus group questions listed in Appendix 2 were part of another project and are not analyzed in this paper.

Focus Group Questions:

1. How many years have you been studying in the Department of Nutritional Sciences?
2. Have you changed your eating habits or grocery shopping habits since beginning your undergraduate program?
3. What is your age?
4. Who is responsible for preparing the majority of your meals?
5. Some students feel that learning the science behind nutrition (nutritional biology, biochemistry, etc.) influences students' eating habits or grocery shopping. Do you think so? Have you experienced this?
 1. Some other students also feel that learning the disease processes and risk factors (Medical nutrition therapy – CVD, liver failure, etc.) influenced their eating habits and grocery shopping. Do you think this has happened to students? Have you experienced this?
6. Has your perception of food and nutrition changed since you began learning about it in more depth? Do you think about food differently?
Examples: perception of food & nutrition, a balanced diet, portion sizes, special diets, etc.
7. Now, compare your current diet to when you were a freshman. Consider each of the food groups. What has changed? What is the same?
8. You said your cooking habits have changed since you began studying nutritional science. Now I would like to ask about those changes in your cooking. What are the key contributors to your cooking habits (i.e. time, money, nutritional concerns)?

Data was analyzed by highlighting common responses into several repeating themes.

These procedures were approved by the Human Subjects Protection Program of the UA, and conducted according to the principles expressed in the Declaration of Helsinki.

Statistical Analysis

For each of the dependent variables of interest, multiple linear regression was used to assess the effects of living situation, major, year in school, and age. This technique was used to allow for the assessment of the effect of two or more independent variables simultaneously.

RESULTS

Survey

The survey was administered to students in the nutritional sciences department (n=280) and students from other departments unrelated to any health sciences (n=105), referred to as majors and non-majors, respectively. Surveyed were 85 major freshmen, 28 non-major freshman, 21 major sophomores, 19 non-major sophomores, 81 major juniors, 40 non-major juniors, 93 major seniors, and 18 non-major seniors.

Survey results showed several statistically significant improvements as major increased and with comparison to non-majors. Senior majors ate more servings of vegetables than freshman majors ($p=0.001$). Non-majors ate fewer servings of vegetables and fruit than majors ($p=0.025$, $p=0.005$). Non-majors consumed significantly more “fast food” than majors per week ($p=0.022$). Non-majors had significantly more meals “prepared” than majors ($p=0.001$). Non-majors had significantly fewer meals compared to majors in which they actively engaged in cooking ($p=0.05$). Majors in their fourth year had significantly more meals in which they actively engaged in cooking than majors in their first year ($p=0.023$). Those living in apartments/houses or with parents/spouse/relatives consumed significantly less “fast food” than those living in dorms ($p<0.001$).

Figure 1.

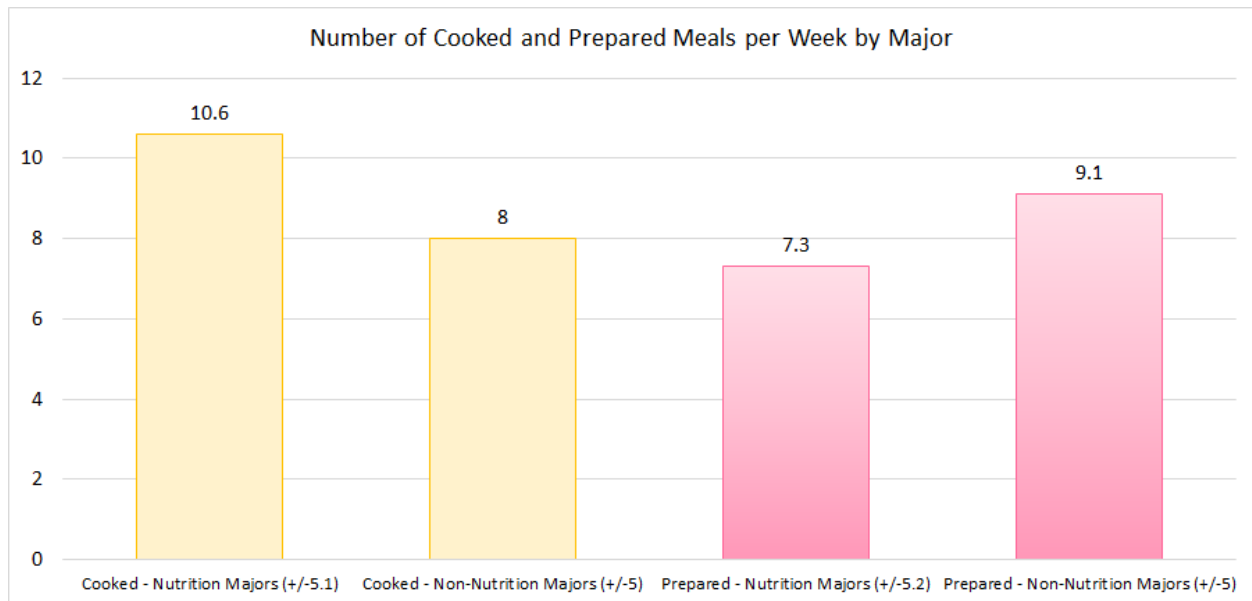


Figure 1. Number of cooked and prepared meals per week by major. Standard deviation in parentheses. These results are statistically significant. Majors cooked an average of 10.6 meals per week. Non-majors cooked an average of only 8 meals per week. Majors prepared an average of only 7.3 meals per week, while non-majors prepared an average of 9.1 meals per week.

Figure 2.

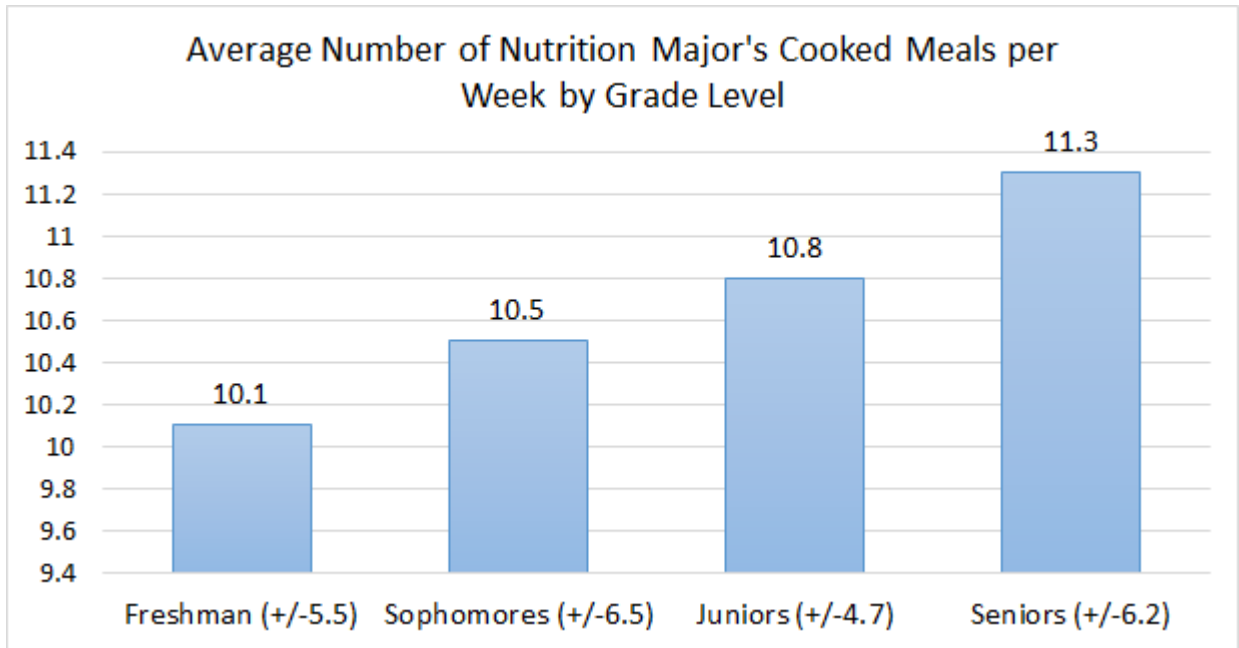


Figure 2. Average number of nutrition major's cooked meals per week by grade level. Standard deviation in parentheses. These results are statistically significant. Freshman majors on average cooked the least amount of meals at 10.1 meals per week. Sophomores cooked a slightly higher average of meals per week at 10.5. Junior majors on average cooked slightly more meals per week than sophomore majors at 10.8 meals per week. Senior majors cooked the most meals on average at 11.3 meals per week.

Figure 3.

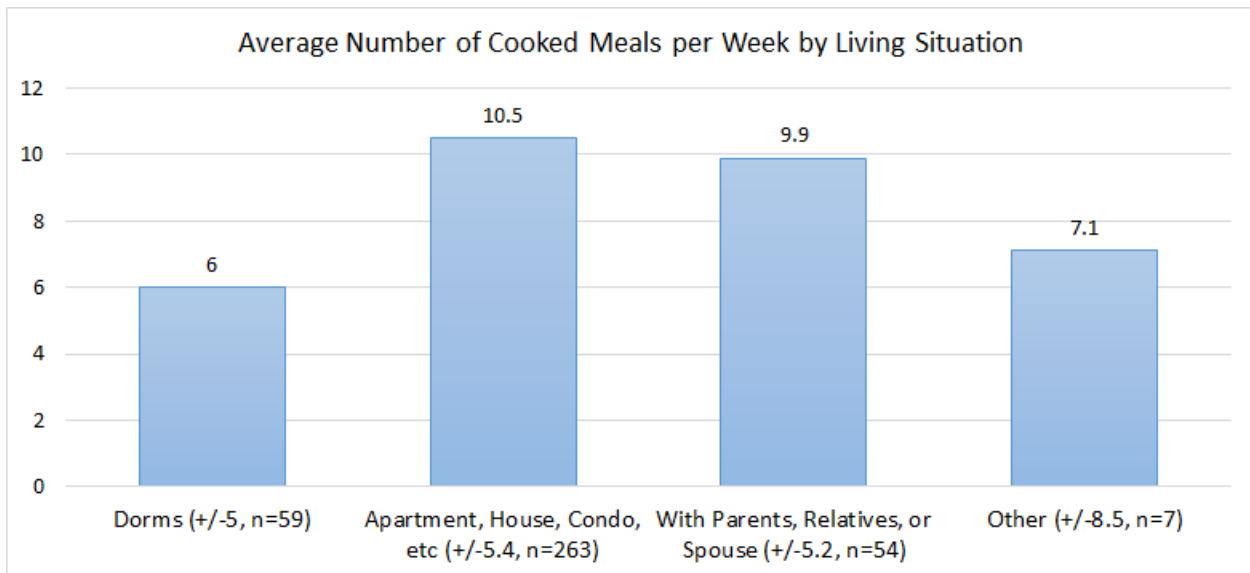


Figure 3. Average number of cooked meals per week by living situation. Number of students per category and standard deviation in parentheses. Those in dorms cooked the

smallest average of meals per week at only 6, while those in an apartment, house, or condo cooked the most meals per week on average at 10.5 (these two values are statistically significant). Those residing with parents, relatives, or spouses cooked an average of 9.9 meals per week, while those whose living situation could be defined as 'other' cooked an average of 7.1 meals per week.

Figure 4.

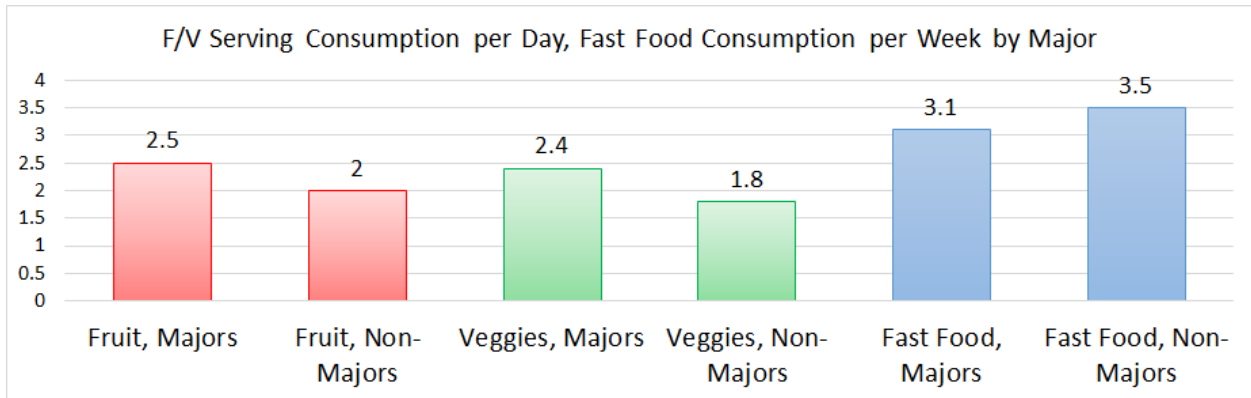


Figure 4. Number of servings of fruits and vegetables consumed per day, number of times fast food is consumed per week, all three by major. These results are statistically significant. Majors ate an average of more servings of fruit per day compared to non-majors at 2.5 and 2, respectively. Majors also ate an average of 2.4 servings of vegetables per day, compared to non-majors at 1.8. Finally, majors consumed less fast food per week on average compared to non-majors, at 3.1 and 3.5, respectively.

Focus Groups

Data was collected from 10 focus groups of 2-4 senior nutritional science students per focus group, totaling 27 students.

Five major themes of responses were observed after careful revision of focus group transcripts. These 5 themes are the 5 most common reasons senior majors revealed to be the reasons behind their reported increase in cooking from freshman to senior year. These include: environment, time management, food education, financial situation, and cooking skills.

Environment. Perhaps the most influential factor in behavior change for this project, several students listed a change of environment from freshman to sophomore year as they moved out of the dorms and into an apartment or house as their main reason for change. Students went into detail describing the reasons why this behavior change was so influential on increasing their cooking habits. They had increased cooking resources that were more commonly available, such as kitchen equipment that was shared by a handful of students instead of over a hundred. They were able to have a larger refrigerator once moving out of the dorms, which was also closer to the kitchen equipment. Some students also reported the increased ability to maintain a cleaner kitchen. Listed below are key excerpts from the transcripts illustrating these factors.

"I cook more now, living in the dorms - it was difficult to cook."

"Instead of microwave, I make stuff now, on the stove."

"I make a lot more of my food; I lived in the dorm freshman year (meal plan); I cook more now."

"I lived in the dorm freshman year... cleaning all that was time consuming. So I ate on campus a lot."

"I definitely cook a lot more because I have access to a kitchen that's mine, and I can clean and not clean after other people."

"I used to eat more easy to prepare food (microwave foods), didn't have access to kitchen (dorm)... difficult to cook in dorm because [I] didn't have [access to] resources"

"Freshman year you have a microwave. So having a kitchen was a huge step for me."

Time Management. Students also commonly reported an increase in time management skills as they got older and become more familiar with how to manage their college lives. They did not necessarily have more time for cooking, but they had an increased ability to make time for cooking in their busy schedules. This was often due to an increased enjoyment of and desire to cook. Below are transcript examples.

"I have been more organized with making lunch, more efficient and economical"

"It's stress-relieving."

"I have less time, but it makes me feel good."

"Time is my number one priority; [I] use [a] Crockpot a lot – reduces cooking time; makes a lot of portions."

"Time is the biggest factor in cooking habits; [I] plan my meals early on so I can be efficient with meal preparation."

"Living in a sorority house now, there are designated meals; as a freshman there weren't set meal times, so a friend would say "let's go get chips!" and we'd go get chips; now meals are more established and set in time."

"I make time to cook. I get excited about things that taste good to me now."

"I have... better time management"

"Freshman year was crazy and had less time, but then you mature and learn to prioritize and relax, so I've been cooking a lot more. "

"I felt overwhelmed with managing time in college. I ate a lot of frozen or pre-prepared food before. Then I learned how to organize myself better. I prefer cooking fresh food now."

Food Education. As thought in the original research hypothesis, education about food and cooking has had some degree of impact on student's cooking habits as they progressed through the major. Below are key statements made by students which demonstrate this point.

"[I] learned about the content of some foods along the way, [the] last few years – I do not eat added sugar."

"I incorporate more fats. Freshman year I thought it just made you fat, but I use more olive oil and almond butter into my meals."

"I get a little healthier everyday as a result of learning."

"Protein intake has changed since I was a freshman, because of a diabetes assignment Mary gave us."

"I try to exclude processed foods and try to make foods from scratch instead of buying anything frozen, just because I learned how much sodium it has."

Cooking Skills. Students mention an increase in their ability to cook, which in turn increased the amount of time they spent cooking. Some said this comes from a cooking class required by the nutrition major department or from moving out of the dorms. Others simply had gained more knowledge on cooking over time since they were a freshman.

"I cook a lot more and I have more skills than when I was a freshman."

"If I would cook, it would have been canned beans, canned rice, canned chicken, and that's all microwaveable, but now I use like kitchen equipment like we did in Spark's classes."

"I hardly knew how to cook as a freshman."

"I roast more fish than when I was a freshman."

"I use [a] Crockpot too; [I] use the cast iron griddle more now."

"I learned some cooking skills in Sparks's lab."

Financial Situation. A final way students frequently mentioned their cooking habits increased was through a change in their financial situation. Students had to cook more once they no longer had a meal plan, which ties back to environment change and moving after freshman year. Some also obtained jobs and began working, and had an increased perception of ability to buy foods for which cooking was required. Below are examples from the transcripts.

"I have more money to spend on fruits and veggies."

"My financial situation has changed. Now I eat... a lot more fruits and vegetables and a good variety."

"Now I don't have a meal plan. Now if I want to eat out, I have to spend my money from my paycheck. "

"I have to meal prep so I don't spend money."

DISCUSSION

The results from the survey and the focus groups support the hypothesis that as students in the nutritional sciences department progress through their coursework with the advancement of each undergraduate year, they spend more time cooking their meals and less time preparing them or eating fast food due to increased knowledge and experience with cooking and its health benefits. However, we could not assume this to be true from the surveys alone, and focus groups were necessary. What we found out from the focus groups was the realization that these beneficial changes are not solely due to the nutrition-based college education received by these students. Several other factors have significant influence, such as increasing time management skills, environment changes, changes in financial situation, and an increase in cooking skills. What is notable about this is that these are factors which are likely to be experienced by any college students, and are not necessarily unique to students in the nutrition department. This may be why several of the statistically significant results are very close to each other. For example, Figure 2 shows the number of meals prepared per week by nutritional science majors goes up by a mere tenths of a meal per undergraduate year level. However, it does appear that the nutrition majors had generally better eating behaviors compared to the non-majors, and nutrition major seniors compared to nutrition major freshman.

There were several limitations to this study. First, the use of an invalidated questionnaire. The 11-question survey was designed primarily by three individuals and has not been proven in accuracy. Second, the nature of the research itself. It is hard to avoid a response set from nutritional science majors who know they are taking a survey about their eating habits. This may be exacerbated as the academic year increases, because senior nutritional science majors have a greater understanding of what it would look like if an individual with a "perfect", balanced diet filled out the survey. Third, some of the surveyed groups - specifically the 21 major sophomores, 19 non-major sophomores, and 18 major seniors - were quite smaller in size compared to the generally accepted standard for group size when it comes to computing statistically significant data (~>30 participants per group). These three factors, especially when combined, may have had some influence on the results.

CONCLUSION

These results show promise for the purpose of education-based behavior change programs aimed at increasing the frequency of cooking and consumption of fruits and vegetables. Larger studies will need to be conducted with a greater number of participants per group, and preferably with a validated questionnaire, especially for nutrition students. However, this study suggests that nutrition-related college education may have a positive impact on decreasing the frequency of fast food consumption, increasing the consumption of fruits and vegetables, and increasing the number of meals that are cooked.

ACKNOWLEDGEMENTS

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CONFLICTS OF INTEREST

The author of this paper was a student in the department of Nutritional Sciences at The University of Arizona at the time of this research project.

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APPENDIX

1. Survey

Nutritional Research Survey

11. What is your age?
12. What is your gender?
- Female
 - Male
13. What is your ethnicity?
- White
 - Hispanic or Latino
 - Black or African American
 - Native American or American Indian
 - Asian / Pacific Islander
 - Other: _____
14. What is your academic status within your major?
- Freshman
 - Sophomore
 - Junior
 - Senior
15. What is your major and emphasis, if applicable (i.e. Nutrition major with dietetics emphasis, or nutrition major with nutrition emphasis)? Otherwise check "Undecided".
- Major: _____ Undecided
- Emphasis: _____ Undecided/None
16. Which of the following best describes your living situation?
- Dorm
 - Apartment, house, condo, etc.
 - With parents/relatives/spouse
 - Other: _____
17. Approximately how many **times per week** do you purchase and/or consume ready-to-eat food requiring **no** preparation on your part, for **immediate consumption**? Examples of where this can occur may include:
- The student union
 - McDonald's
 - Taco Shop
 - Jack in the Box
 - Paradise Bakery
 - A food truck or stand
 - Any restaurant or fast food establishment
- I perform this type of activity about _____ times per week.

18. The chart below is a representation of each meal you consume every day per week on a **usual** basis (over the past month or so). Place an X in the corresponding box for each meal you usually prepare in one of the following ways:

- Microwaving frozen, refrigerated, or canned food
- Boiling noodles (ramen, macaroni, etc)
- Reheating leftover food that you did not originally prepare
- Otherwise making the final preparations to food that has mostly been pre-prepared or does not require much difficulty, such as:
 - Making a peanut butter and jelly sandwich
 - Pouring milk into a bowl full of cereal
 - Rehydrating potato flakes instead of mashing potatoes by hand

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Breakfast							
Lunch							
Dinner							

19. The chart below is a representation of each meal you consume every day per week on a **usual** basis (over the past month or so). Place an X in the corresponding box for each meal you usually prepare in one of the following ways:

- Washing/peeling
- Chopping (dicing, mincing, julienning, etc)
- Mixing/stirring
- Seasoning (basting, preparing a marinade, etc)
- Sautéing/stir-frying/grilling
- Otherwise **actively** engaging in cooking food (**Do not** include time spent watching TV while bread is baking)

	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
Breakfast							
Lunch							
Dinner							

20. Check all that apply to your dietary habits.

- Vegetarian (no meat)
- Pescetarian (no meat except fish)
- Lacto-Vegetarian (no meat or eggs, but dairy allowed)
- Ovo-Vegetarian (no meat or dairy, but eggs allowed)
- Lacto-Ovo-Vegetarian (no meat, dairy and eggs allowed)
- Vegan (no animal flesh or products - i.e. no milk, honey, eggs, dairy, meat, fish, etc.)
- Gluten Free
- Paleo (centered around foods available to human ancestors - nuts, berries, meat, etc.)
- I do not consume red meat
- I do not consume dairy products
- None of these apply to me

Use the table below to help you answer questions 11-16.

11. How many servings of vegetables do you consume per day? Circle a value below.
0 1 2 3 4 5+
12. How many servings of fruit do you consume per day? Circle a value below.
0 1 2 3 4 5+
13. How many servings of grains do you consume per day? Circle a value below.
0 1 2 3 4 5+
14. How many servings of protein do you consume per day? Circle a value below.
0 1 2 3 4 5+
15. How many servings of dairy do you consume per day? Circle a value below.
0 1 2 3 4 5+
16. How many servings of olives, nuts, or seeds do you consume per day? Circle a value below.
0 1 2 3 4 5+

Serving Size Examples

Vegetables	Fruit	Grains	Protein	Dairy	Olives, nuts, seeds
1 cup, chopped	1 cup, chopped 1 fruit (orange, apple)	½ bagel ½ cup cooked rice/ pasta 3 cups popcorn 1 slice bread	1 ounce meat 1 egg ¼ cup cooked beans	1 cup milk, yogurt, frozen yogurt 1 ½ oz hard cheese	1 tbsp Peanut Butter ½ ounce nuts (12 almonds)

17. How frequently do you shop for groceries?
- Daily
 - 2-3 times per week
 - Weekly
 - Every other week
 - Monthly
18. What type of vendor do you purchase **most** of your groceries from? Choose the option that applies most to you.
- Convenience Store (i.e. Circle K, 7/11, Drug Store, U-Mart, etc.)
 - Warehouse Club (Costco, Sam's Club)
 - Supermarket (Fry's, Safeway, Albertson's, etc.)
 - Megastore (Target, Walmart, etc.)
 - Specialty Store (Trader Joe's, Sprouts, Whole Foods, etc.)
 - Farmers Market
19. How often do you make a grocery list?
- Rarely
 - Sometimes
 - Most of the time
 - Always
20. How much money do you spend on an average grocery bill? Select the range that most applies to your typical trip to the grocery store.
- \$0.00 - \$20.00
 - \$21.00 - \$40.00
 - \$41.00 - \$60.00
 - \$61.00 - \$80.00
 - \$81.00 +
21. When selecting foods to purchase, which factors are important to you? Indicate the level of importance for each of the following factors that contribute to your food purchasing decisions.

Factors	Importance				
	Very	Somewhat	Average	Low	Not
Convenience food (easy to prepare)					
Low cost (value foods)					
Few ingredients (minimally processed)					
Nutrient Claims (low calorie, reduced-fat, etc.)					

22. Check inside the circle or box of the following items you buy regularly:

Produce

- Fruit
- Vegetables
- Herbs

Dairy

- Milk
 - Nonfat
 - 2%
 - Whole
 - Alternative milk (soy, almond, coconut, etc.)
- Creamer
 - Regular
 - Alternative (almond, soy, coconut, etc.)
- Butter
 - Regular
 - Alternative (almond, soy, coconut, etc.)
- Yogurt
 - Greek
 - Regular
 - Alternative (almond, soy, coconut, etc.)

Packaged Snack Foods

- Candy
- Chips
- Cookies
- Crackers
- Popcorn
 - Whole Kernels
 - Microwaveable

Grains/Nuts/Seeds

- Bread/Bagels
 - Whole Grain
 - Refined
- Muffins
- Noodles/Pasta
- Nuts (almonds, cashews, etc.)
- Seeds (sunflower, pumpkin, etc.)

Protein

- Chicken/Turkey
- Beef
- Eggs
- Fish
- Beans
- Tofu

23. Describe what a typical grocery cart looks like for you by checking the box of the relative presence of each of the following food groups.

Food Groups	Presence			
	Very	Somewhat	Low	Not
Produce (fruits, vegetables, herbs)				
Dairy (cheese, milk, yogurt, butter, creamer, etc.)				
Packaged snack foods (chips, cookies, crackers, popcorn)				
Grains, Nuts, and Seeds (bread, bagels, nuts/seeds)				
Protein (chicken, beef, eggs, fish, beans, tofu, etc.)				

2. Focus Group

Interview Questions

Inclusion questions:

9. How many years have you been studying in the Department of Nutritional Sciences?
10. Have you changed your eating habits or grocery shopping habits since beginning your undergraduate program?

Basic Demographic Questions:

1. What is your age?
2. Who is responsible for preparing the majority of your meals?

Questions (Interview):

2. How well do you feel the nutrition department here at the University of Arizona prepares you to provide nutritional advice or counseling in the future?
Why do you think this is so?
3. Have you ever given nutrition advice to others (family, friends, etc.)?
4. Which class, in your opinion, best prepares you to work in the nutrition field?
Why do you think this is so?
5. Some students feel that learning the science behind nutrition (nutritional biology, biochemistry, etc.) influences students' eating habits or grocery shopping.
Do you think so? Have you experienced this?
6. Some other students also feel that learning the disease processes and risk factors (Medical nutrition therapy – CVD, liver failure, etc.) influenced their eating habits and grocery shopping.
Do you think this has happened to students? Have you experienced this?
7. Has your perception of food and nutrition changed since you began learning about it in more depth? Do you think about food differently?
Examples: perception of food & nutrition, a balanced diet, portion sizes, or special diets.
8. Now, compare your current diet to when you were a freshman. Consider each of the food groups.
What has changed? What is the same?
9. Compare your grocery shopping habits now to when you were a freshman. Has the types of food you buy changed? What is the same?
10. What are the key contributors to your shopping habits (i.e. time, money, nutrition concerns?)
11. You said your cooking habits have changed since you began studying nutritional science. Now I would like to ask about those changes in your cooking. What are the key contributors to your cooking habits (i.e. time, money, nutritional concerns)?