**BARRIERS TO COOKING
AND
CULINARY CONFIDENCE
AMONG COLLEGE ATHLETES**

by

Laura Sahd

A thesis submitted to the Faculty of the University of Delaware in partial
fulfillment of the requirements for the degree of Master of Science in Human Nutrition

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ABSTRACT

Background: Newfound independence forces college students to develop their own cooking practices and meal-time behaviors, and, more importantly, college athletes must do this while maintaining their competitive edge. However, this population faces many barriers to cooking at home and struggles to have both confidence in their culinary skills along with a positive attitude toward cooking. Studies have shown that culinary confidence and culinary attitudes play an important role in diet quality and cooking practices. **Objectives:** This study was conducted to determine what barriers affect culinary confidence and culinary attitudes among young adult National Collegiate Athletic Association (NCAA) athletes enrolled as undergraduates at the University of Delaware (UD). Additionally, the cooking practices of the target population and their associations with reported barriers to cooking, culinary confidence, and culinary attitudes were explored. **Design:** This cross-sectional study utilized an online survey. **Methods:** A survey containing questions regarding cooking practices, culinary attitudes, culinary confidence, barriers to cooking, and basic demographic information was distributed to approximately 600 undergraduate NCAA athletes at UD and was completed by 110 respondents who met inclusion criteria. **Statistical Analysis:** Descriptive statistics, Cronbach's alpha, and bivariate regression were used in data analysis. $P \leq .05$ was considered statistically significant. **Results:** Of the 98 participants who answered a question about gender, 24 were males (24.5%) and 74 were females (75.5%). The majority of participants (89.8%) reported being between the ages of 18 and 21 with only 10.2% reporting an age of 22+. Significant barriers to cooking at home included the high cost of food, lack of support from family and/or friends, lack of time, the availability of someone

else to cook meals, and limited access to food, a kitchen, kitchen tools, and transportation to get food. Preparing and cooking a meal using raw/fresh ingredients was positively correlated with both Culinary Confidence Scale scores [$r(103)=.39$, $p<.001$] and Culinary Attitudes Scale scores [$r(108)=.32$, $p=.001$]. A negative relationship was shown between Culinary Attitudes Scale scores and Barrier Education Scale scores [$r(97)=-.21$, $p=.035$]. **Conclusions:** Results from this study demonstrated that a lack of previous formal and/or informal cooking-related education especially in meal preparation/cooking and recipe reading is related to a more negative attitude toward cooking. Additionally, results showed that lack of support from family and/or friends to cook at home and lack of time to cook at home may be important barriers to high culinary confidence, positive culinary attitudes, and preparing meals at home.

Chapter 1

INTRODUCTION

Obesity related chronic diseases such as cancer, stroke, heart disease, and diabetes are among the leading causes of death in the United States (US).¹ Poor diet quality and physical inactivity play a major role in mortality rates.² A recent study showed that in 2015, only 9% of adults in the US met daily vegetable intake recommendations while 12% met daily fruit intake recommendations.³ Fruit and vegetable consumption was lowest among males, young adults, and adults living in poverty. In general, the majority of Americans do not meet the federal guidelines for daily fruit, vegetable, whole grain, and dairy consumption.⁴

Decreasing trends in US home food preparation is one factor contributing to the inadequate consumption of nutritious foods among Americans. Factors contributing to the downward trend of home food preparation practices are the deskilling of domestic cooks and the lack of basic cooking education programs in schools.^{5,6} In a recent study, the mother was reported as the most common source of learning cooking skills (60.1%) followed by sources such as a different relative at home (16.2%), friends (13.6%), and post-primary school (9.3%).⁷ Since domestic cooks such as mothers, family members, and friends are becoming less skilled and cooking classes continue to disappear from schools, the number of young adults able to cook for themselves will continue to decline. As young people transition from adolescence to adulthood, they are becoming less equipped to prepare nutritious foods

at home. Additionally, young adults report issues such as lack of transportation, little free time, and financial burdens as other barriers to cooking.⁸

Many young adults are enrolled in higher education institutions.⁹ Among college students, there are over 460,000 National Collegiate Athletic Association (NCAA) student athletes.¹⁰ During their college careers, athletes face additional barriers to cooking such as even less free-time due to practices and games and specific physique requirements for their sport.¹¹ It is important to identify and address barriers to cooking among young adult athletes to be sure they are receiving proper fuel to perform at their optimum level.

Chapter 2

LITERATURE REVIEW

2.1 Introduction to Target Population

The transition from adolescence to young adulthood is filled with drastic lifestyle changes including beginning college and entering the workforce.¹² Demographically, according to the US Census Bureau, young adults are defined as people ages 18 to 34 and made up about 23.4% of the US population from 2009-2013.¹³ Furthermore, as of 2012, 31.2 million young adults between the ages of 18 and 24 were living in the US accounting for 13% of the total population.⁹ Developmentally, this group of people falls into the late adolescence to early adulthood categories.¹² Young adults and, more specifically, emerging young adults are often thought of as college age, but only about 41% of this population was enrolled in higher education institutions in 2012.⁹ Although attaining a college degree may mean higher pay or more job opportunities, it does not ensure health and well-being in the future and has only been associated with significantly lower rates of obesity among women, not men.¹⁴

During the 2018-2019 academic year, 24,120 students were enrolled at the University of Delaware (UD) and 19,060 of them were undergraduate students.¹⁵ For athletes specifically, according to the rosters on the Delaware Blue Hens website, there were 273 male athletes and 323 female athletes on UD sports teams in 2018.¹⁶ Without knowing which athletes participated on more than 1 of the 20 UD teams, the total number of NCAA athletes was 596 in 2018.

2.2 Overweight, Obesity, and Chronic Disease Among Young Adults

In 2007-2010, young adults ages 18-24 had a 1 in 5 chance of being obese.⁹ According to the National College Health Assessment from 2018, 23.8% of college students are overweight and 16.2% are obese.¹⁷ In 2008, obesity related medical costs were \$147 billion in the US¹⁸ and continued to rise to \$149.4 billion in 2014.¹⁹ It is well established that obesity is linked to many health concerns including heart disease, stroke, type 2 diabetes,²⁰ and some cancers.²¹ Equipping young adults to cook healthy meals in the kitchen may be a start to solving the complex issue of obesity in the US.

2.3 The Nutrition Transition in the US

In high-income countries such as the US, researchers have predicted the shift from what was once a hunter-gatherer diet composed of mostly plants and wild animals to a diet high in foods that are easily accessible such as processed foods which are high in fat and sugar and low in fiber.^{22,23} Humans have always strived to reduce the effort needed to carry out everyday tasks by inventing everything from the wheel to modern food processing techniques.²³ Referred to as the Nutrition Transition, this concept examines the characteristics of major shifts in diet and activity patterns and how they parallel changes in nutritional status, health outcomes, demographics, and socioeconomics. Currently, the US is amid a rapid shift from pattern 3 (receding famine) to pattern 4 (degenerative disease) where high-calorie, convenience foods are consumed in excess and people are less active causing the rates of obesity and obesity-related chronic diseases such as diabetes and heart disease to rise to unfathomable levels.²⁴ In the US, key dietary changes associated with the nutrition transition include increased snacking,²⁵ sweetened beverage intake,²⁶ portion sizes,²⁷ and away-from-home food consumption.²⁸

2.4 Cooking Practices and Diet Quality

Extensively, studies have linked cooking practices to diet quality. From 1965-1966 to 2007-2008, the number of calories consumed from home-cooked meals and the time spent preparing food at home decreased significantly in the US.²⁹ During this same time, the frequency of eating meals away from home increased. Additionally, although home food sources still made up two-thirds of the diet in 2007-2008, a downward shift in time spent cooking was observed from 1965-1966 meaning more families were utilizing pre-packaged and pre-cooked meals at home.

These trends have also been demonstrated during young adulthood. Among young adults, one study found that 33% of males and 23% of females consumed fast food 3 or more times per week.³⁰ A diet that often involves eating on the run has been associated with higher intakes of sugar-sweetened beverages, total fat, and saturated fat.³¹ Furthermore, in another study, young adults who prepared foods at home had a higher diet quality while eating take-away foods and convenience foods was associated with poorer diet quality.³² It is well supported in the literature that frequent intake of fast food can lead to poor diet quality,³³ weight gain and insulin resistance,³⁴ and a higher Body Mass Index (BMI).³⁵

2.5 Cooking Skills and Diet Quality

Learning basic cooking skills has also been proven to be an important predictor of diet quality. As of 2018, college students reported inadequate fruit and vegetable intake as evidenced by a mere 4.8% eating 5 or more servings of fruit and vegetables per day.¹⁷ When asked about adequacy of their skills and resources for food preparation, 23.2% of males and 18.3% of females ages 18 to 23 reported they were inadequate or very inadequate.³⁶ The acquisition of basic cooking skills during

childhood, adolescence, and young adulthood has been associated with a dietary pattern more closely aligned with the Dietary Guidelines for Americans including an increase in fruit and vegetable consumption.^{7,36-38} Additionally, research has shown that although engaging adolescents in food preparation increased interest in cooking and continued use of these skills, engaging young adults in food preparation had a lasting impact on healthy eating habits by increasing fruit and vegetable intake and consistent breakfast and lunch consumption, while decreasing fast food consumption.³⁹ Another study found that if adults reported adequate cooking skills in young adulthood, they were more likely to prepare meals with vegetables most days, identify as the usual food preparer in the household, eat 3 or more servings of vegetables per day, and consume fast food less frequently.⁴⁰

2.6 Theory

The ecological perspective of health promotion suggests that the health behaviors of a person are influenced by individual factors such as knowledge, attitudes, and beliefs, interpersonal factors such as friends and family, institutional factors including rules and regulations, community factors including social norms, and public policy factors including federal, state, and local laws.⁴¹ For example, some factors that may affect eating behaviors among young adults include food availability, the media, familial norms, peer influences, fad diets, personal beliefs such as health values, food preferences, and self-efficacy.¹² In addition to multiple levels of influence, another key concept addressed by the ecological perspective is reciprocal causation.⁴¹ Reciprocal causation suggests that an individual's behavior influences and is influenced by the social environment. The ecological perspective emphasizes

the importance of multi-level interventions that target the different factors that influence a health problem.

Specifically, on the interpersonal level, social cognitive theory (SCT) suggests that health behaviors are a product of the interactions between personal, behavioral, and environmental factors.⁴¹ According to SCT, self-efficacy, goals, and outcome expectancies are the 3 main factors that determine whether a person will change a health behavior. Self-efficacy is defined as, “the set of beliefs that one can perform adequately in a particular situation”⁴² and is the most important personal factor in behavior change.^{41,43,44} If individuals are not confident in their abilities to control their health behaviors, then they will not persist through any barriers or challenges that arise on the path to their goals.⁴¹ Likewise, if young adults have low culinary confidence and face additional barriers to cooking then the behavior of cooking meals at home will not be able to flourish.

2.7 Culinary Confidence and Culinary Attitudes

As SCT suggests, studies have shown that culinary confidence has a profound effect on cooking practices and diet quality. In a study where college students from an introductory nutrition course were surveyed, cooking confidence was found to be positively correlated with fruit and vegetable intake.⁴⁵ Familiarity with cooking techniques was also reported to be a motivator for home food preparation during focus groups conducted with over 200 college students from 2 universities in Texas.⁴⁶ Young adults are developing their identity and beginning to make independent choices identifying this as a crucial time to learn and practice healthy eating habits and basic culinary skills.

Culinary attitudes also play an important role in cooking practices and healthy eating behaviors. European adults were surveyed about their cooking skills, and enjoyment of cooking was found to be the most important predictor of cooking skills especially among men.³⁷ Another study conducted with over 1,000 Australian women found that women who reported cooking as a chore were less likely to eat 2 or more fruits and vegetables each day.⁴⁷ Cooking attitudes among young adults have also been positively correlated with fruit and vegetable intake indicating positive attitudes toward cooking could increase diet quality.⁴⁵

Cooking interventions have a substantial impact on culinary attitudes and culinary confidence. A study showed that after exposing mothers to some kind of cooking intervention, enjoyment, confidence, and intention to cook from basic ingredients increased significantly.⁴⁸ In a randomized controlled trial that involved Brazilian university students, cooking attitudes and self-efficacy for using cooking techniques were measured at baseline, after a nutrition and culinary intervention, and then at 6 months post-intervention.⁴⁹ Immediately after the intervention, cooking attitudes and self-efficacy for using cooking techniques significantly increased among the students in the treatment group but not among the control group participants. Furthermore, these effects were still observed among the treatment group participants at 6 months post-intervention.

2.8 Barriers to Cooking

Many barriers to cooking have been documented in the literature. Lack of time is a major barrier to food preparation reported by young adults.³⁶ Adults who spent less than 1 hour a day on food preparation spent more money on food away from home and utilized fast food more often than adults who spent additional time

preparing food at home.⁵⁰ In addition to lack of time, factors affecting the preparation of healthy meals among young adults include lack of culinary knowledge and skill, financial uncertainty, and inadequate access to healthy foods.⁸ Among adults, barriers to cooking include time pressures, desires to save money and have effortless meals, family food preferences, and effects of kitchen disasters.⁵¹ Finally, studies show that men are both less likely to be highly involved in food preparation at home³⁶ and less likely to report adequate cooking and food skills than females.⁵²

2.9 College Athlete Cooking Skills and Barriers to Cooking

In the current study, athletes are targeted due to the increased importance of this population consuming an adequate diet for proper growth and/or development as well as athletic performance.⁵³ A recent study showed that 44.4% of former Division 1 NCAA athletes 22 to 51 years of age from the same university were overweight or obese.⁵⁴ Nutrition knowledge has been positively associated with better diet quality among athletes.⁵⁵

The exploration of culinary attitudes, culinary confidence, and barriers to cooking among college athletes is limited. A study measured culinary self-efficacy among a group of athletes before and after a cooking education intervention that included a recipe demonstration and hands-on food preparation activity.⁵⁶ The researchers observed a significant increase in self-efficacy for healthy food selection and food preparation after the cooking intervention. Another study used focus groups consisting of athletes, coaches, and sports dietitians to identify barriers to cooking among college athletes.¹¹ Common barriers reported included lack of time, financial limitations, inadequate cooking skills, difficult living arrangements, insufficient access

to healthy foods, specific physique requirements, lifestyle, and limited nutrition knowledge.

Substantial studies exploring how this impressionable population adapts its cooking and eating habits during a time of newfound independence are lacking.⁸ To effectively and efficiently create and administer nutrition and culinary education programs that will reduce the risk of disease later in life, further examination of factors affecting culinary attitudes, culinary confidence, and cooking practices among young adult athletes enrolled as undergraduate students is warranted.

Chapter 3

AIMS

3.1 Primary Aim

The primary aim of this project is to explore what barriers affect culinary confidence and culinary attitudes among young adult NCAA athletes enrolled as undergraduates at UD.

3.1.1 Research Questions

1. What are the barriers to cooking among undergraduate NCAA athletes at UD?
2. What is the level of culinary confidence among undergraduate NCAA athletes at UD?
3. What are the culinary attitudes among undergraduate NCAA athletes at UD?
4. What are the associations between reported barriers to cooking and culinary confidence and culinary attitudes among undergraduate NCAA athletes at UD?

3.1.2 Hypotheses

1. Ho1: There will be no significant relationship between subjects' barriers to cooking and their culinary confidence.
2. Ho2: There will be no significant relationship between subjects' barriers to cooking and their culinary attitudes.

3.2 Secondary Aim

The secondary aim of this project is to explore cooking practices and their association with reported barriers to cooking, culinary confidence, and culinary attitudes among young adult NCAA athletes enrolled as undergraduates at UD.

3.2.1 Research Questions

1. What are the cooking practices among undergraduate NCAA athletes at UD?
2. What are the associations between cooking practices and barriers to cooking, culinary confidence, and culinary attitudes among undergraduate NCAA athletes at UD?

3.2.2 Hypotheses

1. Ho3: There will be no significant relationship between subjects' cooking practices and their barriers to cooking.
2. Ho4: There will be no significant relationship between subjects' cooking practices and their culinary confidence.
3. Ho5: There will be no significant relationship between subjects' cooking practices and their culinary attitudes.

The findings of this study can be used to support the need for culinary classes in secondary and post-secondary education, especially for athletes. Conclusions may also help to guide administrators, policy makers, and program developers by identifying common barriers that may affect cooking behaviors among college students and, more specifically, college athletes. Other benefits may include the realization of the need for interventions such as campus food pantries for college athletes and other students as well as habitual cooking demonstrations and classes for the target population.

Chapter 4

METHODS

4.1 Overview

All project materials including the project's protocol, consent form, survey questions, and email scripts were submitted to and approved by UD's Institutional Review Board (IRB) prior to beginning the study to ensure they met the standards for the protection of human subjects. After receiving final approval from the IRB, the research team initiated the study. This cross-sectional study utilized an online survey. The population of interest was undergraduate NCAA athletes at UD who were 18 years of age or older.

4.2 Procedure

To begin the study, members of the research team met with the UD sports dietitian to discuss her role in emailing all NCAA UD athletes an invitation to participate in the study. This email (Appendix A.1) served as recruitment for the study and included a written explanation of the open opportunity to enroll in the study and a link to the consent document (Appendix A.2) and survey (Appendix A.3). The recruitment email was sent 3 times for optimal participation. Prior to survey completion, participants were instructed to review the informed consent form. By following the link to the survey, participants provided consent to participate in the study and acknowledged they read the informed consent form.

After providing consent, participants were asked to fill out a 10- to 15-minute-long survey containing questions about cooking practices, culinary attitudes, culinary confidence, barriers to cooking, and basic demographic information with the incentive of the opportunity to enter a raffle to win 1 of 8 \$25 Amazon.com gift cards. After the

participants completed the survey, they were directed to a separate form (Appendix A.4) to provide their email addresses to enter the raffle for the chance to receive a gift card code via email (Appendix A.5). This way, personal information was not associated with survey responses.

All survey responses were kept strictly anonymous and were not linked to any personal information. Arbitrary IDs were assigned to all surveys and computer task data. Participants' email addresses were used for recruitment and incentive purposes but were not linked to survey responses and were kept strictly confidential. In reporting or during discussions, no references were made about participants that could potentially link them to the study or their responses.

4.3 Sampling and Recruitment

The research team recruited participants by having the UD sports dietitian email all NCAA athletes an explanation of the study and an invitation to participate. The recruitment email was sent 3 times for optimal participation. Athletes who wanted to participate were asked to click on a link in the email that took them to the informed consent form. By following the link to the survey, participants provided consent to participate in the study and acknowledged they read the informed consent form. After providing consent, participants were asked to complete the survey. The population of the study consisted of approximately 600 UD athletes participating on or committed to an NCAA sports teams at UD from September 2018-December 2018.

For participants to be included in the study, they needed to be 18 years of age or older, an undergraduate student at UD, and participating on or committed to an NCAA sports team at UD. Eligibility was determined by the initial 3 questions of the

survey (Appendix A.6). If a participant's response to 1 of those questions identified an athlete as ineligible, the survey ended immediately.

4.4 Instrument

The online survey was developed using Qualtrics survey software.⁵⁷ The research team utilized findings from the literature review and their own knowledge from experience to develop the survey questions. After the survey draft was developed, it was sent to 5 experts in the field of nutrition and health with expertise in areas such as survey development and research with athletes for an evaluation of face validity. Feedback regarding the flow, content, and wording of the survey questions was received from each reviewer, and changes to the survey were made. The final survey consisted of 43 questions and was preceded by a brief description of the study and then 3 questions to determine eligibility. Only those who continued to the survey after reading the description and answered "yes" to all 3 eligibility questions could complete the survey. Participants who answered "no" to any of the eligibility questions were directed to a screen stating they were ineligible for the study and thanked them for their time.

4.4.1 Cooking Practices

Cooking practices questions were developed to assess usual cooking practices of college athletes. Survey item 1 was developed to assess what method of food procurement was most often used by the respondent. Items 2-5 were developed to assess how often participants exhibited certain cooking practices in the past week. Decisions about which categories of cooking to include in these questions were supported by a study that attempted to define what the word "cooking" meant to

different people.⁵⁸ The findings of that study suggested that rather than defining meals as cooked and not cooked, people tend to think of cooking in 1 of 3 categories: scratch cooking, semi-scratch cooking, and quick meals. All cooking practices questions on this survey asked participants to report how many times per week they exhibited a cooking behavior from never to 3 or more times per day.

4.4.2 Culinary Confidence and Culinary Attitudes

The next 2 sections of the survey assessed culinary attitudes and culinary confidence. Items 6-18 were adapted from scales created to fill the need for survey instruments that accurately measure effectiveness of culinary and nutrition education programs.⁵⁹ In that study, scales measuring cooking attitudes and cooking self-efficacy were developed as well as scales focusing on concepts such as cooking behavior, produce consumption self-efficacy, self-efficacy for using basic cooking techniques, self-efficacy for using fruits, vegetables, and seasonings, and knowledge of cooking terms and techniques. All but the cooking behavior and self-efficacy for using fruits, vegetables, and seasonings scales were found to be valid and reliable among the study population of parents and caregivers from South Carolina Head Start preschools, church preschools, public elementary schools, and playgroup settings. Items 13, 16, and 18 were edited to reflect the wording used in a survey that adapted the previously mentioned scales to assess cooking beliefs and practices and how they relate to the diet quality of young adults.⁴⁵ Permission was received from the researchers themselves or their faculty advisors to use survey questions in the current study.

Adapted from a validated scale by Michaud,⁵⁹ culinary attitudes (items 6-12) were assessed in this study by participants rating their agreement with statements such

as “cooking is frustrating”⁵⁹ utilizing the answers strongly agree, agree, neither agree nor disagree, disagree, and strongly disagree. Items 7, 9, and 11 reflected a positive attitude toward cooking and were coded beginning at 1, strongly disagree, to 5, strongly agree.⁵⁹ Items 6, 8, 10, and 12 reflected a negative attitude toward cooking and were reverse-coded. This way, higher culinary attitudes scores reflected a more positive attitude toward cooking.

For items 13-18, participants were instructed to rate how confident they felt that, if they wanted to, they could execute a variety of cooking tasks such as “use basic cooking techniques (such as steaming, sautéing, and roasting).”^{45,59} A 5-point Likert scale was given for response to these questions with 1 being not at all confident and 5 being extremely confident. Higher culinary confidence scores indicated a higher confidence in culinary abilities.

4.4.3 Barriers to Cooking

To assess barriers to cooking, no validated tool was found. Therefore, barriers to cooking survey items 19-30 were developed using a tool created to assess perceived personal, social, and environmental barriers to physical activity and healthy eating among young women at high risk for weight gain,⁶⁰ discoveries from a focus group held with college students to discuss barriers to culinary confidence,⁸ and results from a study that asked college athletes, coaches, and dietitians about barriers to cooking.¹¹ In items 19-30, participants were asked to rate how much they agree with statements about potential barriers to cooking using a 5-point Likert scale with 1 being strongly disagree and 5 being strongly agree.

4.4.4 Demographics

Finally, the demographics section included questions that assessed age, sex, year in school, major course of study, sports played, current living situation, tobacco use, past formal cooking education, and interest in future formal cooking education. Questions about ethnicity and race were written in accordance with recommendations from the US Census Bureau.⁶¹

4.5 Data Analysis

The data were analyzed using JMP Pro version 14.0.⁶² Descriptive data were analyzed for all variables. Cronbach's alpha was used as a measure of reliability for the BARR Education Scale, BARR Access Scale, Culinary Confidence Scale, and Culinary Attitudes Scale. Bivariate regression analysis was used to assess the relationship between cooking practices, culinary attitudes, culinary confidence, and barriers to cooking. The significance level for all tests was set at $p \leq .05$.

Barriers to cooking were labeled as BARR 1-12 (Table 2) and analyzed separately. Therefore, each question was treated as a single scale and coded as follows: strongly agree = 5, agree = 4, neither agree nor disagree=3, disagree = 2, strongly disagree = 1. Mean scores were calculated for each barrier in order to determine which barriers to cooking were the most critical among undergraduate NCAA athletes at UD. BARR 1-4 were treated as a single scale and termed the BARR Education Scale. BARR 5-8 were also treated as a single scale and termed the BARR Access Scale. Total scale scores for both the BARR Education Scale and BARR Access Scale represented a sum of component BARR scores coded as follows: strongly agree = 5, agree = 4, neither agree nor disagree=3, disagree = 2, strongly disagree = 1. BARR scale scores could range from 4 to 20, 4 meaning something is

not at all a barrier to cooking and 20 meaning something is a major barrier to cooking. The remaining barriers, BARR 9-12 were only assessed individually. Additional barriers were collected from responses to question 31, “An additional barrier that I have to cooking is...” Descriptive statistics were calculated for total scale scores and individual scores for analysis.

The 7 items from the Culinary Attitudes Scale were treated as a single scale. Responses to items 7, 9, and 11 were calculated as follows: strongly agree = 5, agree = 4, neither agree nor disagree=3, disagree = 2, strongly disagree = 1. Responses to items 6, 8, 10, and 12 were reversed coded and calculated as follows: strongly agree = 1, agree = 2, neither agree nor disagree=3, disagree = 4, strongly disagree = 5. A total scale score was calculated by adding up all responses and could range from 7 to 35, 7 being an extremely negative attitude toward cooking and 35 being an extremely positive attitude toward cooking. Descriptive statistics were calculated for analysis.

The 6 items from the Culinary Confidence Scale were treated as a single scale and a total score was calculated as follows: extremely confident=5, confident=4, neither confident nor unconfident=3, not very confident=2, and not at all confident=1. A total scale score was calculated by adding up all responses and could range from 6 to 30, 6 being extremely low culinary confidence and 30 being extremely high culinary confidence. Descriptive statistics were calculated for analysis.

To determine the associations between barriers to cooking and both culinary confidence and culinary attitudes, bivariate linear regression analysis was used. Total BARR scale scores and individual BARR scores were compared to the Culinary Confidence Scale scores. Likewise, total BARR scale scores and individual BARR scores were compared to the Culinary Attitudes Scale scores. Independent variables

were BARR individual and scale scores. In the first regression model, the dependent variable was Culinary Confidence Scale scores. In the second regression model, the dependent variable was Culinary Attitudes Scale scores.

Cooking practices questions were labeled as COOK 1-5 for analysis. For COOK 1, participants responded to the prompt “If I am hungry and it is meal time, I am most likely to...” with either cook for myself, have someone else cook for me, order out, or go out. COOK 1 was analyzed as a categorical variable and frequency of responses were determined. COOK 2-5 asked participants in the past week how often they cooked using raw/fresh ingredients (COOK 2), cooked using convenience/semi-prepared foods (COOK 3), cooked using pre-made meals that only require reheating (COOK 4), and ate food away from home (COOK 5). Responses to COOK 2-5 were coded as Never=0, 1-2 times per week=1, 3-4 times per week=2, 5-6 times per week=3, 1 time per day=4, 2 times per day=5, and 3 or more times per day=6. Descriptive statistics were calculated for COOK 2-5. Bivariate linear regression analysis was used to compare COOK 2-5 responses to BARR 1-12 responses, BARR Education Scale scores, BARR Access Scale scores, Culinary Confidence Scale scores, and Culinary Attitudes Scale scores.

Chapter 5

RESULTS

5.1 Description of Respondents

Of the approximately 600 student athletes who were invited to participate in the study, 127 at least started the survey by reading the brief study description. After this, 1 respondent dropped out since only 126 respondents answered the following 3 eligibility questions. Of these 126 respondents, 1 respondent was directed to the end of the survey due to age ineligibility, and 15 respondents dropped out of the survey after answering “yes” to all 3 eligibility questions. Data were analyzed for the remaining 110 respondents. Since respondents were not required to answer all questions and could stop the survey at any time, the results are based on the number answering a particular question or set of questions not necessarily the total sample.

5.2 Demographics

Of the 110 respondents, 97 completed all of the demographic questions and 1 participant completed all of the demographic questions except for the question about ethnicity. Of the 98 participants who answered a question about gender, 24 were males (24.5%) and 74 were females (75.5%). The majority of participants (89.8%) reported being between the ages of 18 and 21 with only 10.2% reporting an age of 22+. Most participants lived off-campus (71.4%) while 28.6% lived on-campus in dormitories. Overwhelmingly, participants reported living with friends or roommates (92.9%), 6.1% lived by themselves, and 1.0% lived with family. Of the 97 participants that answered a question about ethnicity, 87.6% identified as Not Hispanic or Latino and 12.4% identified as Hispanic or Latino. In regard to race, 86.7% of participants

identified as white, 6.1% as Black or African American, 6.1% as More than one race, and 1.0% as Other.

Most participants reported never using tobacco products (92.9%), but 6.1% reported being an ex-tobacco user, and 1.0% reported currently using tobacco. Years in school were almost evenly represented with 22 first years (22.4%), 23 second years (23.5%), 27 third years (27.6%), and 22 fourth years (22.4%) participating in the study. Since degree programs are often 4 years in length, fifth year students are less common and accounted for 4.1% of participants in this study.

Since some students may have a double major, participants were able to choose up to 2 majors. Presented in Table 1, frequencies were calculated for each of the 8 major groups: Business & Economics, Education, English, Health & Nutrition (includes Healthcare, Nutrition, and Hotel, Restaurant, and Institutional Management), More than one major, Social Science (includes Psychology, Public Policy and Political Science, History and Cultural Studies, Communications, and Sociology), STEM (includes Environmental Studies, Biology, Engineering, Chemistry, Computer Science, and Mathematics), and Undeclared.

To allow for athletes who take part in more than 1 NCAA sport, participants were able to choose up to 2 sports. Presented in Table 1, frequencies were calculated for each of the 14 sports groups: Baseball, Basketball, Field Hockey, Football, Golf, Lacrosse, More than one sport, Rowing, Running (any combination of Cross Country, Indoor Track and Field, and Outdoor Track and Field), Soccer, Softball, Swimming & Diving, Tennis, and Volleyball.

Table 1 Demographics

<i>n</i> =98			<i>n</i> =98		
Age	<i>n</i>	%	Gender	<i>n</i>	%
18	15	15.3	Male	24	24.5
19	23	23.5	Female	74	75.5
20	30	30.6	Major		
21	20	20.4	Business & Economics	21	21.4
22+	10	10.2	Education	2	2.0
Living Location			English	2	2.0
Off-campus house, apartment, or condo	70	71.4	Health & Nutrition	23	23.5
On campus dormitory	28	28.6	More than one major	8	8.2
Living Situation			Social Science	14	14.3
On my own	6	6.1	STEM	22	22.4
With friends/roommates	91	92.9	Undeclared	6	6.1
With family	1	1.0	Sport		
Race			Baseball	5	5.1
Black or African American	6	6.1	Basketball	4	4.1
White	85	86.7	Field Hockey	3	3.1
More than one race	6	6.1	Football	7	7.1
Other	1	1.0	Golf	5	5.1
Tobacco Use			Lacrosse	10	10.2
Current tobacco user	1	1.0	More than one sport	1	1.0
Ex-tobacco user	6	6.1	Rowing	18	18.4
Never used tobacco	91	92.9	Running	8	8.2
Year in School			Soccer	8	8.2
1	22	22.4	Softball	2	2.0
2	23	23.5	Swimming & Diving	19	19.4
3	27	27.6	Tennis	3	3.1
4	22	22.4	Volleyball	5	5.1
5	4	4.1	<i>n</i>=97		
			Ethnicity	<i>n</i>	%
			Hispanic or Latino	12	12.4
			Not Hispanic or Latino	85	87.6

5.3 Barriers to Cooking

For the 98 participants that answered questions about barriers to cooking, mean scores were calculated for each barrier to determine which barriers to cooking were the most critical among undergraduate NCAA athletes at UD. Results are summarized in Table 2. With 1 meaning something is not at all a barrier to cooking and 5 meaning something is a major barrier to cooking, the highest mean score (3.11) was BARR11 “I do NOT have time to cook meals” followed by cooking education related barriers, BARR1 (2.92), BARR2 (2.73), BARR3 (2.73), and BARR4 (2.73). The barrier with the lowest mean score was BARR10 (1.80) indicating lack of support from friends and family to cook at home is not a major barrier to cooking.

Table 2 Barriers to Cooking

			<i>n</i> =98	
			Mean	SD
Barrier Education Scale		I have NOT received previous formal (classes) or informal (family/friends)...		
	BARR 1	education regarding nutritious meal planning	2.92	1.23
	BARR 2	education regarding meal preparation/cooking	2.73	1.14
	BARR 3	education regarding grocery shopping	2.73	1.15
	BARR 4	education regarding reading a recipe	2.73	1.20
Barrier Access Scale		I do NOT have...		
	BARR 5	a kitchen to prepare foods	2.08	1.32
	BARR 6	the proper kitchen tools to prepare food	2.19	1.33
	BARR 7	adequate transportation to get food to cook	2.41	1.38
	BARR 8	access to appropriate foods/ingredients	1.90	1.05
	BARR 9	I am NOT able to buy the food and supplies I need to cook because they are too expensive	2.23	1.07
		I do NOT have...		
	BARR 10	support from family and/or friends to cook at home	1.80	0.93
	BARR 11	time to cook meals	3.11	1.20
	BARR 12	I do NOT cook because someone else cooks my meals	2.14	1.18

5.4 Scales

Cronbach's alpha was used as a measure of reliability for the Barrier Education Scale, Barrier Access Scale, Culinary Confidence Scale, and Culinary Attitudes Scale. Cronbach's alpha is a standard measure used to determine the average inter-item correlations between a set of variables. A level of .70 or higher is a general standard for scale construction. All scales used in this study had a Cronbach's alpha of .70 or higher (Table 3).

Table 3 Cronbach's Alpha and Descriptive Statistics for Scales

Scale	Cronbach's alpha	<i>n</i>	Mean	SD	Adj Mean ^a	Min	Max
BARR Education Scale	0.891	98	11.12	4.10	2.78	4	20
BARR Access Scale	0.814	98	8.58	4.10	2.15	4	20
Culinary Confidence Scale	0.848	104	23.85	4.34	3.98	11	30
Culinary Attitudes Scale	0.786	109	25.82	4.47	3.69	16	35

^aFor the adjusted (Adj) mean, the mean scores were divided by the number of items on each scale for ease of comparison and interpretation with the original scales.

5.5 Cooking Practices

Of the 110 participants, 61.8% of participants said they cook for themselves, 4.5% said they have someone else cook for them, 6.4% said they order out, and 27.3% said they go out. Table 4 is a summary of the average responses to cooking practices questions.

Table 4 Cooking Practices

		<i>n</i> =110	
		Mean	SD
	In the past week, how often did you...		
COOK 2	Prepare and cook a meal using raw/fresh ingredients, for example, making a stir-fry from raw meat and fresh vegetables	1.67	1.70
COOK 3	Prepare and cook a meal using convenience/semi-prepared foods such as jarred sauces, packaged mixes, etc.	1.54	1.21
COOK 4	Prepare and cook a meal using pre-made meals that only require reheating such as frozen meals, frozen pizza, etc.	0.91	1.03
COOK 5	Eat at a restaurant, order take-out food, get fast food, have a team meal, eat at a dining hall, etc.	2.22	1.67

5.6 Aim 1 Correlations

Table 5 is a summary of the results from the Pearson Correlation analysis and *p*-values between barriers to cooking, culinary confidence, and culinary attitudes. Results showed a negative relationship between Culinary Confidence Scale scores and lack of support from family and/or friends [$r(97)=-.40, p<.001$], availability of someone else to cook meals [$r(97)=-.27, p=.007$], lack of time [$r(97)=-.27, p=.008$], and limited kitchen tools [$r(97)=-.23, p=.022$]. Similarly, a negative relationship was shown between Culinary Attitudes Scale scores and lack of time [$r(97)=-.39, p<.001$], lack of support from family and/or friends [$r(97)=-.37, p<.001$], lack of previous education on recipe reading [$r(97)=-.23, p=.020$], high cost of food [$r(97)=-.21, p=.034$], BARR Education Scale scores [$r(97)=-.21, p=.035$], and lack of previous education on meal preparation/cooking [$r(97)=-.21, p=.040$].

5.7 Aim 2 Correlations

Table 5 is also a summary of the results from the Pearson Correlation analysis and p -values between cooking practices and barriers to cooking. Overall, no significant correlations were found between preparing and cooking a meal using pre-made meals that only require reheating and barriers to cooking scale and individual scores. Also, no significant correlations were found between cooking practices and education related barriers, lack of access to food, and BARR Education Scale scores.

Results showed a negative relationship between preparing and cooking a meal from raw/fresh ingredients and limited kitchen tools [$r(97)=-.50, p<.001$], availability of someone else to cook meals [$r(97)=-.48, p<.001$], lack of a kitchen [$r(97)=-.48, p<.001$], lack of time [$r(97)=-.44, p<.001$], BARR Access Scale scores [$r(97)=-.36, p<.001$], high cost of food [$r(97)=-.24, p=.017$], and lack of support from family and/or friends [$r(97)=-.23, p=.022$].

Additionally, a negative relationship was found between preparing and cooking a meal from convenience/semi-prepared foods and lack of a kitchen [$r(97)=-.51, p<.001$], limited kitchen tools [$r(97)=-.48, p<.001$], availability of someone else to cook meals [$r(97)=-.46, p<.001$], BARR Access Scale scores [$r(97)=-.43, p<.001$], and lack of transportation [$r(97)=-.25, p=.011$].

Conversely, results showed a positive relationship between eating foods away from home and limited kitchen tools [$r(97)=.60, p<.001$], availability of someone else to cook meals [$r(97)=.58, p<.001$], lack of a kitchen [$r(97)=.57, p<.001$], BARR Access Scale scores [$r(97)=.47, p<.001$], lack of time [$r(97)=.33, p=.001$], high cost of food [$r(97)=.26, p=.010$], lack of transportation [$r(97)=.23, p=.023$], and lack of support from family and/or friends [$r(97)=.23, p=.023$].

Table 5 Correlations Between Culinary Confidence, Culinary Attitudes, Cooking Practices, and Barriers to Cooking

Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1. Culinary Confidence Scale	1.00																			
2. Culinary Attitudes Scale	.59**	1.00																		
3. Raw/fresh ingredients	.39**	.32**	1.00																	
4. Convenience foods	.07	-.03	.58**	1.00																
5. Pre-made meals	-.13	-.24*	-.04	.24*	1.00															
6. Eating away from home	-.27**	-.06	-.54**	-.44**	-.05	1.00														
7. BARR Education Scale	-.10	-.21*	.07	.18	.11	-.13	1.00													
8. BARR Access Scale	-.15	.05	-.36**	-.43**	-.04	.47**	.00	1.00												
9. Lack of ed. meal planning	-.04	-.11	.05	.11	.13	-.13	.82**	.01	1.00											
10. Lack of ed. cooking	-.18	-.21*	.06	.19	.01	-.08	.87**	-.03	.63**	1.00										
11. Lack of ed. grocery shopping	-.04	-.19	.07	.19	.13	-.05	.88**	.02	.59**	.67**	1.00									
12. Lack of ed. recipe reading	-.11	-.23*	.07	.14	.11	-.17	.90**	.00	.61**	.73**	.79**	1.00								
13. No kitchen	-.20	-.01	-.48**	-.51**	-.07	.57**	-.02	.89**	-.03	-.01	.01	-.03	1.00							
14. No kitchen tools	-.23*	.02	-.50**	-.48**	-.03	.60**	-.03	.86**	-.02	-.04	-.01	-.05	.86**	1.00						
15. Limited transportation	.10	.23*	.00	-.25*	-.12	.23*	.01	.78**	.01	-.04	.05	.03	.51**	.50**	1.00					
16. Limited access to food	-.19	-.11	-.16	-.10	.10	.07	.04	.67**	.07	-.01	.03	.06	.44**	.37**	.45**	1.00				
17. Cost too high	-.05	-.21*	-.24*	-.13	.03	.26**	.01	.42**	-.09	.07	.04	.00	.31**	.42**	.32**	.31**	1.00			
18. Lack of support	-.40**	-.37**	-.23*	-.13	.13	.23*	.08	.41**	.05	.07	.06	.08	.36**	.29**	.19	.53**	.39**	1.00		
19. Lack of time	-.27**	-.39**	-.44**	-.17	.15	.33**	-.01	.27**	-.06	.09	-.03	-.03	.25*	.30**	.11	.19	.51**	.37**	1.00	
20. Someone else cooks	-.27**	-.08	-.48**	-.46**	-.03	.58**	-.01	.60**	.02	.00	.01	-.07	.63**	.61**	.33**	.34**	.31**	.40**	.29**	1.00

**Correlation is significant at .01 level (2-tailed)

*Correlation is significant at .05 level (2-tailed)

Table 5 is a summary of the results from the Pearson Correlation analysis and *p*-values between cooking practices, culinary confidence, and culinary attitudes. Results showed a positive relationship between preparing and cooking a meal using raw/fresh ingredients and Culinary Confidence Scale scores [$r(103)=.39, p<.001$]. Also, results showed a negative relationship between eating foods away from home and Culinary Confidence Scale scores [$r(103)=-.27, p=.006$]. Furthermore, a positive relationship was found between preparing and cooking a meal using raw/fresh ingredients and Culinary Attitudes Scale scores [$r(108)=.32, p=.001$]. A negative relationship was shown between preparing and cooking a meal using pre-made meals that only require reheating and Culinary Attitudes Scale scores [$r(108)=-.24, p=.012$].

Although correlations between the different barriers to cooking scale and individual scores were also shown in Table 5, these relationships were not explored further due to irrelevance to the aims of this study.

5.8 Other Results

Culinary Attitudes Scale scores had a positive correlation with Culinary Confidence Scale scores [$r(103)=.59, p<.001$]. Of the 98 participants that answered a question about prior cooking education, the majority of participants, 73.5%, had not attended a formal cooking education class previously while 26.5% were formally taught how to cook. When the same 98 participants were asked if they were interested in attending a formal cooking class or demonstration in the future, 69.4% said yes and 30.6% said no.

Chapter 6

DISCUSSION

6.1 General Discussion

Substantial studies exploring the cooking behaviors and beliefs of young adults during a time of newfound independence are lacking. Additionally, even fewer studies have targeted the cooking behaviors and beliefs of undergraduate NCAA athletes. The aim of this study was to explore the extent to which barriers affected culinary confidence and culinary attitudes among young adult NCAA athletes enrolled as undergraduates at UD. In addition, this study described the cooking practices of young adult athletes and their association with reported barriers to cooking, culinary confidence, and culinary attitudes.

In accordance with findings from previous studies, time was identified as the most burdensome barrier to cooking. In a study with young adults, 34.6% of males and 37.2% of females indicated that time available for food preparation was either inadequate or very inadequate.³⁶ In the current study, 44.9% of all participants, 50.0% of males, and 43.2% of females agreed or strongly agreed that time was a barrier to cooking. Other barriers to cooking questions with about one-third of participants responding with either agree or strongly agree included lack of previous education on meal planning (41.8%), meal preparation/cooking (34.7%), grocery shopping (32.7%), and recipe reading (35.7%).

Educational barriers were not significantly correlated with any cooking practices. However, Barrier Education Scale scores, lack of previous education on meal preparation/cooking, and lack of education on recipe reading were significantly, negatively correlated with Culinary Attitudes Scale scores. These results indicate that

lack of previous formal and/or informal cooking-related education especially in meal preparation/cooking and recipe reading may contribute to a more negative attitude toward cooking. Also, in this study, a significant, positive relationship existed between preparing and cooking a meal using raw/fresh ingredients and both Culinary Confidence Scale scores and Culinary Attitudes Scale scores. Research shows that young adults who prepared foods at home had a higher diet quality while eating take-away foods and convenience foods was associated with poorer diet quality.³² According to another study, culinary attitudes have been positively correlated with fruit and vegetable intake among young adults indicating a positive attitude toward cooking could increase diet quality.⁴⁵ Overall, it is important to address barriers that affect culinary attitudes to encourage cooking at home and improve diet quality among the target population.

Additionally, in a previous study, cooking confidence was positively correlated with enjoyment of cooking.⁴⁸ Similarly, in the current study, culinary attitudes and culinary confidence were found to be significantly and positively correlated with each other reinforcing their interdependence. Barriers to cooking that had a significant, negative relationship with both Culinary Confidence Scale and Culinary Attitudes Scale scores were lack of support from friends and/or family to cook at home and lack of time to cook at home. Interventions to improve both culinary confidence and culinary attitudes among college athletes should prioritize increasing support and time for cooking at home. Cooking classes including instruction on quick meals may be best received by the target audience and, since support is also so important, groups of students with similar interests and/or that spend a lot of time together like athletes

should be targeted by interventions to create a social environment supportive of cooking at home.

This study showed a significant, negative relationship between cooking from raw/fresh ingredients and cooking from convenience/semi-prepared foods and barriers to cooking scale and individual scores. As the frequency of cooking at home increased, some barriers to cooking scale and individual scores decreased. Barriers related to cooking from raw/fresh ingredients and cooking from convenience/semi-prepared foods included lack of a kitchen, limited kitchen tools, availability of someone else to cook meals, and BARR Access Scale scores. Frequency of cooking from raw/fresh ingredients was also related to the high cost of food, lack of support from family and/or friends, and lack of time. Frequency of preparing and cooking a meal using convenience/semi-prepared foods was also related to a lack of transportation. In summary, barriers to cooking at home included limited access to food, a kitchen, kitchen tools, and transportation to get food, the high cost of food, lack of support from family and/or friends, lack of time, and the availability of someone else to cook meals. These results were similar to those from another study that found reported barriers to healthy eating among college athletes were lack of time, financial limitations, inadequate cooking skills, difficult living arrangements, insufficient access to healthy foods, specific physique requirements, lifestyle, and limited nutrition knowledge.¹¹

A significant, positive relationship was found between the frequency of eating foods away from home and barriers to cooking scale and individual scores. Eating foods from outside of the home was significantly, positively correlated with lack of a kitchen, limited kitchen tools, lack of transportation, high cost of food, lack of support

from family and/or friends, lack of time, availability of someone else to cook meals, and BARR Access Scale scores. As these barriers to cooking increased, so did the frequency of eating foods away from home. Eating take-away foods and convenience foods has been associated with poorer diet quality among young adults.³² Again, there are numerous findings that suggest frequent intake of fast food can lead to poor diet quality,³³ weight gain and insulin resistance,³⁴ and a higher BMI³⁵ and former athletes are no exception.⁵⁴

6.2 Implications

The current study demonstrated that lack of previous formal and/or informal cooking-related education especially in meal preparation/cooking and recipe reading is related to a more negative attitude toward cooking. Positive cooking attitudes have previously been linked to fruit and vegetable intake and overall higher diet quality.^{45,47} In this study, more positive culinary attitudes were associated with more frequent preparation of meals from raw/fresh ingredients a cooking practice which has also been linked to better overall diet quality.³² These findings indicate a need for cooking education throughout the education system specifically during young adulthood and among college athletes. The majority of the public in the US support cooking skills being taught in schools either through health education classes (64%) or family and consumer science courses (67%).⁶³ Young adult athletes are also supportive of cooking education as evidenced by 69.4% of study participants reporting they would attend a cooking class or demonstration in the future.

Results from this study suggest that lack of support from family and/or friends to cook at home and lack of time to cook at home may be important barriers to high culinary confidence, positive culinary attitudes, and preparing meals at home. Cooking

classes including instruction on quick meals may be best received by the target audience and, since support is also so important, groups of students with similar interests and/or that spend a lot of time together like athletes should be targeted by cooking interventions to create a social environment supportive of cooking at home. Additional barriers to cooking at home identified in this study include limited access to food, a kitchen, kitchen tools, and transportation to get food, the high cost of food, and the availability of someone else to cook meals. University-wide policy, systems, and environmental change efforts need to be initiated to provide students with access to affordable food and cooking-related tools, opportunities to learn basic cooking skills, and, overall, a supportive campus-culture that empowers them to make time to cook at home. The feasibility of implementing a food pantry on campus that incorporates other services to help combat these barriers to cooking should be explored.

In the time of a Nutrition Transition,^{22,23} people are eating foods away from home more than ever²⁹ which is a behavior known to decrease diet quality³¹⁻³³ and subsequently increase the likelihood of chronic disease later in life.² Unfortunately, these trends are poised to have a major effect on the most impressionable populations including young adults. Newfound independence forces college students to develop their own cooking practices and meal-time behaviors, and, more importantly, college athletes must do this while maintaining their competitive edge. However, this population faces many barriers to cooking at home and struggles to have both confidence in their culinary skills along with a positive attitude about cooking.^{8,11,36} Studies have shown that culinary confidence and culinary attitudes play an important role in diet quality and cooking practices.^{37,45-47}

6.3 Recommendations

All results from this study can only identify correlations between variables, not causation. Additional studies including randomized controlled trials, interventional studies, and/or longitudinal studies should be conducted to determine causality. Studies that demonstrate similar results with a larger sample size and/or utilizing other populations from different geographic locations, age groups, income levels, etc. would strengthen these findings. The data in this study was collected via a survey, but future research should consider a mixed-method approach and include qualitative data collection methods such as focus groups, interviews, and direct behavioral observations.

Chapter 7

CONCLUSIONS

Results from this study showed a relationship between the barriers to cooking, culinary confidence, and culinary attitudes among young adult NCAA athletes enrolled as undergraduates at UD. In addition, this study also demonstrated how the cooking practices of this population are related to barriers to cooking, culinary confidence, and culinary attitudes. These results indicate that it might be beneficial for young adults to participate in cooking education classes and be intentionally provided with supports from their university community to cook at home. All results from this study can only identify correlations between variables, not causation. It would be beneficial to conduct randomized controlled trials as well as cooking intervention studies to determine if manipulating barriers to cooking influence cooking practices, culinary confidence, and culinary attitudes.

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Appendix

STUDY MATERIALS

A.1 Email Recruitment Scripts

Email Recruitment Scripts

Email #1

Subject Line: Short Survey Chance to Win Amazon Gift Card

Hello Athletes,

I am passing along the opportunity to participate in a research study. Please see the message from the student conducting the study below and contact her with any questions.

Hello,

My name is Laura Sahd, and I am a graduate student in the University of Delaware's Behavioral Health and Nutrition Department. I kindly request your help by participating in my research study. The purpose of this study is to explore the cooking practices, culinary attitudes, culinary confidence, and barriers to cooking of NCAA athletes at the University of Delaware. To be eligible for this study you must be 18 or older, an undergraduate student at the University of Delaware, and participating on or committed to an NCAA sports team at UD.

If you decide you would like to participate in this study, you will need to meet eligibility criteria, provide consent, and fill out a ten- to fifteen-minute-long survey containing questions about cooking practices, culinary attitudes, culinary confidence, barriers to cooking, and basic demographic information. Once completed, you will have the **option to enter a raffle to win one of eight \$25 Amazon gift cards**. You can take the survey and enter the raffle only once.

Participation in this study is completely voluntary, and all survey responses will be kept strictly anonymous. **The full informed consent form is provided with this email for your reference.**

If you should have any further questions about this study or have trouble opening and/or taking the survey, please feel free to contact me, Laura Sahd, at lsahd@udel.edu.

To take the survey, please click on the link below

[Take the Survey](#)

Or copy and paste the URL into your internet browser:

https://delaware.ca1.qualtrics.com/jfe/form/SV_0PrzzJkMbUGliQd

Thank you in advance for your time and participation,

Laura Sahd, RD, LDN
Master's in Human Nutrition

[Link to Copy of Informed Consent Form](#)

Email #2

Subject Line: Short Survey Chance to Win Amazon Gift Card

Hello Athletes,

Again, I am passing along the same opportunity to participate in a research study. Please see the message from the student conducting the study below and contact her with any questions.

Hello,

My name is Laura Sahd, and I am a graduate student in the University of Delaware's Behavioral Health and Nutrition Department. I kindly request your help by participating in my research study. The purpose of this study is to explore the cooking practices, culinary attitudes, culinary confidence, and barriers to cooking of NCAA athletes at the University of Delaware. To be eligible for this study you must be 18 or older, an undergraduate student at the University of Delaware, and participating on or committed to an NCAA sports team at UD.

If you decide you would like to participate in this study, you will need to meet eligibility criteria, provide consent, and fill out a ten- to fifteen-minute-long survey containing questions about cooking practices, culinary attitudes, culinary confidence, barriers to cooking, and basic demographic information. Once completed, you will have the **option to enter a raffle to win one of eight \$25 Amazon gift cards**. You can take the survey and enter the raffle only once.

Participation in this study is completely voluntary, and all survey responses will be kept strictly anonymous. **The full informed consent form is provided with this email for your reference.**

If you should have any further questions about this study or have trouble opening and/or taking the survey, please feel free to contact me, Laura Sahd, at lsahd@udel.edu.

To take the survey, please click on the link below

[Take the Survey](#)

Or copy and paste the URL into your internet browser:

https://delaware.ca1.qualtrics.com/jfe/form/SV_0PrzzJkMbUGliQd

Thank you in advance for your time and participation,
Laura Sahd, RD, LDN
Master's in Human Nutrition

[Link to Copy of Informed Consent Form](#)

Email #3

Subject Line: Short Survey Chance to Win Amazon Gift Card

Hello Athletes,

I am passing along the final opportunity to participate in this study since it will close soon. Please see the message from the student conducting the study below and contact her with any questions.

Hello,

My name is Laura Sahd, and I am a graduate student in the University of Delaware's Behavioral Health and Nutrition Department. I kindly request your help by participating in my research study. The purpose of this study is to explore the cooking practices, culinary attitudes, culinary confidence, and barriers to cooking of NCAA athletes at the University of Delaware. To be eligible for this study you must be 18 or older, an undergraduate student at the University of Delaware, and participating on or committed to an NCAA sports team at UD.

If you decide you would like to participate in this study, you will need to meet eligibility criteria, provide consent, and fill out a ten- to fifteen-minute-long survey containing questions about cooking practices, culinary attitudes, culinary confidence, barriers to cooking, and basic demographic information. Once completed, you will have the **option to enter a raffle to win one of eight \$25 Amazon gift cards**. You can take the survey and enter the raffle only once.

Participation in this study is completely voluntary, and all survey responses will be kept strictly anonymous. **The full informed consent form is provided with this email for your reference.**

If you should have any further questions about this study or have trouble opening and/or taking the survey, please feel free to contact me, Laura Sahd, at lsahd@udel.edu.

To take the survey, please click on the link below

[Take the Survey](#)

Or copy and paste the URL into your internet browser:

https://delaware.ca1.qualtrics.com/jfe/form/SV_0PrzzJkMbUGliQd

Thank you in advance for your time and participation,
Laura Sahd, RD, LDN
Master's in Human Nutrition

[Link to Copy of Informed Consent Form](#)

A.2 Informed Consent Form

University of Delaware

IRB Approved From: 10/12/2018 to: 10/11/2021

INFORMED CONSENT TO PARTICIPATE IN RESEARCH

Title of Project: Barriers to Cooking and Culinary Confidence Among College Athletes

Principal Investigator: Laura Sahd

You are being invited to participate in a research study. This consent form tells you about the study including its purpose, what you will be asked to do if you decide to take part, and the risks and benefits of being in the study. Please read the information below and ask us any questions you may have before you decide whether or not you agree to participate.

WHAT IS THE PURPOSE OF THIS STUDY?

The primary aim of this study is to explore what barriers affect culinary confidence and culinary attitudes among young adult athletes enrolled as undergraduates at the University of Delaware. Cooking practices among this population will also be studied and how they relate to barriers to cooking, culinary confidence, and culinary attitudes. The results of this study will be used in a graduate student's thesis report and future publications.

You will be one of approximately 100 participants in this study. You are being asked to participate because you are over the age of 18, an undergraduate student, and participating on or committed to an NCAA sports team at the University of Delaware. If you are under the age of 18, not an undergraduate student, and/or not participating on or committed to an NCAA sports team at the University of Delaware, you will be excluded from this study.

WHAT WILL YOU BE ASKED TO DO?

If you decide you would like to participate in this study, you will be asked to fill out a survey containing questions about cooking practices, culinary attitudes, culinary confidence, barriers to cooking, and basic demographic information.

This one-time survey will be administered electronically through Qualtrics and should only take ten to fifteen minutes to complete.

WHAT ARE THE POSSIBLE RISKS AND DISCOMFORTS?

It is not expected that your participation in this study will expose you to any risks different from those you would encounter in daily life.

WHAT ARE THE POTENTIAL BENEFITS?

You will not benefit directly from taking part in this research. However, the knowledge gained from this study may contribute to our understanding of barriers that affect culinary confidence, culinary attitudes, and cooking practices among college athletes.

Page 1 of 3

Form Rev. 01/2017

HOW WILL CONFIDENTIALITY BE MAINTAINED? WHO MAY KNOW THAT YOU PARTICIPATED IN THIS RESEARCH?

All survey responses will be kept strictly anonymous and will not be linked to any personal information. Arbitrary IDs will be assigned to all surveys and computer task data. Participant e-mail addresses will be used for recruitment and incentive purposes but will not be linked to survey responses.

Electronic data will be stored on a password protected network and flash drive; hard copies, if any, will be kept in a locked cabinet in the Department of Behavioral Health and Nutrition. All data will be stored for a minimum of three years.

Every effort will be made to keep all research records that identify you confidential. The findings of this research may be presented or published. If this happens, no information that gives your name or other details will be shared.

The confidentiality of your records will be protected to the extent permitted by law. Your research records may be viewed by the University of Delaware Institutional Review Board, which is a committee formally designated to approve, monitor, and review biomedical and behavioral research involving humans. Records relating to this research will be kept for at least three years after the research study has been completed.

WILL THERE BE ANY COSTS TO YOU FOR PARTICIPATING IN THIS RESEARCH?

There are no costs associated with participating in this study.

WILL YOU RECEIVE ANY COMPENSATION FOR PARTICIPATION?

No, but once the survey is completed, participants will have the option to enter into a raffle to win one of eight, \$25 Amazon gift cards. If a participant withdraws from the study before completing the survey, he/she will not be able to enter into the raffle.

DO YOU HAVE TO TAKE PART IN THIS STUDY?

Taking part in this research study is entirely voluntary. You do not have to participate in this research. If you choose to take part, you have the right to stop at any time. If you decide not to participate or if you decide to stop taking part in the research at a later date, there will be no penalty or loss of benefits to which you are otherwise entitled. Your decision to stop participation, or not to participate, will not influence current or future relationships with the University of Delaware.

If, at any time, you decide to end your participation in the study, please stop responding to survey questions and close out of the window. If you do not complete the survey, you will not be able to enter the gift card raffle. You can take the survey and enter the raffle only once.

WHO SHOULD YOU CALL IF YOU HAVE QUESTIONS OR CONCERNS?

University of Delaware

IRB Approved From: 10/12/2018 to: 10/11/2021

If you have any questions about this study, please contact the Principal Investigator, Laura Sahd, at ltsahd@udel.edu or one of her academic advisors Dr. Sandra Baker at bakers@udel.edu or Dr. Chengshun Fang at rfang@udel.edu.

If you have any questions or concerns about your rights as a research participant, you may contact the University of Delaware Institutional Review Board at hsrb-research@udel.edu or (302) 831-2137.

By continuing to the survey, it implies that you consent to participating in this study and agree to the following: 1) you are at least 18 years old; 2) you have read and understand the information given in this form; 3) you have asked any questions you have about the research and the questions have been answered to your satisfaction; and 4) you accept the terms in the form and volunteer to participate in the study. You have been given a copy of this form to keep.

A.3 Survey

Barriers to Cooking and Culinary Confidence Among College Athletes Survey 2018

Thank you so much for your willingness to complete this short survey!

Remember, all survey responses will be kept strictly anonymous and will not be linked to any personal information.

Once the survey is completed, you will have the option to enter into a raffle to win one of eight, \$25 Amazon gift cards. If, at any time, you decide to end your participation in the study, please stop responding to survey questions and close out of the window. If you do not complete the survey, you will not be able to enter the gift card raffle. You can take the survey and enter the raffle only once.

For more details or if you have any questions, please refer to the invitation email and the informed consent form provided in the email or contact Laura Sahd at lsahd@udel.edu.

By continuing to the survey, it implies that you consent to participating in this study and agree to the following: 1) you are at least 18 years old; 2) you have read and understand the information given in the informed consent form; 3) you have asked any questions you have about the research and the questions have been answered to your satisfaction; and 4) you accept the terms in the form and volunteer to participate in the study. You have been given a copy of the informed consent form to keep.

COOKING PRACTICES

Please answer the following questions about your cooking practices. Choose ONE response for each item.

1. If I am hungry and it is meal time, I am most likely to...
- Cook for myself
 - Have someone else cook for me
 - Order out
 - Go out

In the past week, how often did you...							
2. Prepare and cook a meal using raw/fresh ingredients , for example, making a stir-fry from raw meat and fresh vegetables	Never	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 or more times per day
3. Prepare and cook a meal using convenience/semi-prepared foods such as jarred sauces, packaged mixes, etc.	Never	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 or more times per day
4. Prepare and cook a meal using pre-made meals that only require reheating such as frozen meals, frozen pizza, etc.	Never	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 or more times per day
5. Eat at a restaurant, order take-out food, get fast food, have a team meal, eat at a dining hall, etc.	Never	1-2 times per week	3-4 times per week	5-6 times per week	1 time per day	2 times per day	3 or more times per day

CULINARY ATTITUDES

For each item below, indicate the extent to which you agree or disagree with the statement about cooking. Choose ONE response for each item.

6. I do NOT like to cook because it takes too much time.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
7. Meals made at home are affordable.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
8. Cooking is frustrating.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
9. I like trying new recipes.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
10. It is too much work to cook.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
11. Making meals at home helps me to eat more healthfully.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
12. I find cooking tiring.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

CULINARY CONFIDENCE

For each item below, indicate the extent to which you feel confident about performing the particular activity. Choose ONE response for each item.

How confident do you feel that, if you wanted to, you could...					
13. Cook meals prepared from basic ingredients (such as whole, fresh produce and raw chicken)	Not at all Confident	Not Very Confident	Neither Confident nor Unconfident	Confident	Extremely Confident
14. Follow a written recipe (ex: preparing fresh salsa from tomatoes, onion, garlic, and jalapeno peppers)	Not at all Confident	Not Very Confident	Neither Confident nor Unconfident	Confident	Extremely Confident
15. Prepare dinner from items you currently have in your pantry and refrigerator	Not at all Confident	Not Very Confident	Neither Confident nor Unconfident	Confident	Extremely Confident
16. Use knife skills in the kitchen (such as slicing, dicing, and chopping)	Not at all Confident	Not Very Confident	Neither Confident nor Unconfident	Confident	Extremely Confident
17. Plan nutritious meals	Not at all Confident	Not Very Confident	Neither Confident nor Unconfident	Confident	Extremely Confident
18. Use basic cooking techniques (such as steaming, sautéing, and roasting)	Not at all Confident	Not Very Confident	Neither Confident nor Unconfident	Confident	Extremely Confident

BARRIERS TO COOKING

When you have the opportunity to cook, indicate the extent to which you agree or disagree with the statement about barriers to cooking. Choose ONE response for each item below. For the final question, please indicate any other barriers to cooking you experience that are not mentioned previously.

19. I have NOT received previous formal (classes) or informal (family/friends) education regarding nutritious meal planning.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
20. I have NOT received previous formal (classes) or informal (family/friends) education regarding meal preparation/cooking.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
21. I have NOT received previous formal (classes) or informal (family/friends) education regarding grocery shopping.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
22. I have NOT received previous formal (classes) or informal (family/friends) education regarding reading a recipe.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
23. I do NOT have a kitchen to prepare foods.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
24. I do NOT have the proper kitchen tools to prepare foods.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
25. I do NOT have adequate transportation to get food to cook meals.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
26. I do NOT have access to foods/ingredients appropriate for my cultural/ethnic background.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
27. I am NOT able to buy the food and supplies I need to cook because they are too expensive.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree

28. I do NOT have support from family and/or friends to cook at home.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
29. I do NOT have time to cook meals.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
30. I do NOT cook because someone else cooks my meals.	Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
31. An additional barrier that I have to cooking is... (optional)					

DEMOGRAPHICS

Please complete the following questions about yourself.

32. What is your age (in years)? (Choose one)

- ☐ 18
- ☐ 19
- ☐ 20
- ☐ 21
- ☐ 22+

33. What is your sex? (Choose one)

- ☐ Male
- ☐ Female
- ☐ Prefer not to answer

34. What year are you in school? (Choose one)

- ☐ First year
- ☐ Second year
- ☐ Third year
- ☐ Fourth year
- ☐ Fifth year

35. What category BEST describes your major course of study? (Choose one) If you are a double major, choose up to two answers. (Choose two)

- ☐ Agriculture
- ☐ Biology
- ☐ Business and Economics
- ☐ Chemistry
- ☐ Communications
- ☐ Computer Science
- ☐ Education
- ☐ English
- ☐ Engineering
- ☐ Environmental Studies
- ☐ Fine Arts
- ☐ Food Science
- ☐ History and Cultural Studies
- ☐ Hotel, Restaurant, and Institutional Management
- ☐ International Studies
- ☐ Languages
- ☐ Mathematics
- ☐ Nutrition
- ☐ Healthcare
- ☐ Philosophy
- ☐ Physics
- ☐ Psychology

- Public Policy and Political Science
- Sociology
- Undeclared

36. What sport do you play as an NCAA athlete at UD? (Choose one). If you are on multiple NCAA teams, choose up to two answers. (Choose two)

- Baseball
- Basketball
- Cross Country
- Field Hockey
- Football
- Golf
- Lacrosse
- Rowing
- Soccer
- Softball
- Swimming & Diving
- Tennis
- Indoor Track and Field
- Outdoor Track and Field
- Volleyball

37. Where do you live when you are at school? (Choose one)

- Off-campus house, apartment, or condo
- On campus dormitory
- Sorority or fraternity housing

38. Which of the following best describes your current living situation? (Choose one)

- On my own
- With friends/roommates
- With family

39. What is your ethnicity? (Choose one)

- Hispanic or Latino
- Not Hispanic or Latino

40. What is your race? (Choose one)

- American Indian or Alaskan Native
- Asian
- Black or African American
- Native Hawaiian or Other Pacific Islander
- White
- More than one race
- Other

41. Which of the following apply to you? (Choose one)

- Current tobacco user

- ☐ Ex-tobacco user
- ☐ Never used tobacco

42. In the past, I have received formal cooking education (e.g. took a cooking class).

- ☐ Yes
- ☐ No

43. In the future, I am interested in participating in a cooking class or attending a cooking demo.

- ☐ Yes
- ☐ No

**We thank you for your time spent taking this survey.
Your response has been recorded.**

If you would like to be entered into the gift card raffle, please click on the link below.

[Link to Incentive Email Collection](#)

A.4 Incentive Email Collection

Incentive Email Collection

If you would like to be entered into the raffle to win one of eight, \$25 Amazon gift cards, please provide your University of Delaware (UD) email address (Student ID followed by @udel.edu) below so we can get in touch with you if you are selected as a winner. Only winners will be contacted. Your email address will not be associated with your survey responses.

UD email _____

A.5 Raffle Winner Email Script

Raffle Winner Email Script

Subject Line: Raffle WINNER Cooking and Athletes Survey

Hello,

Congratulations! You have been randomly selected as a WINNER of a \$25 Amazon Gift Card. Thank you again for your participation in the study *Barriers to Cooking and Culinary Confidence Among College Athletes*. We are pleased to give you this Amazon Gift Card Code.

[Amazon Gift Card Code here]

Best wishes,
Laura Sahd

A.6 Eligibility Questions

Eligibility Questions

Are you 18 or older?

- ☐ Yes
- ☐ No

Are you an undergraduate student at the University of Delaware?

- ☐ Yes
- ☐ No

Are you participating on or committed to an NCAA sports team at the University of Delaware?

- ☐ Yes
- ☐ No

A.7 IRB Exemption Letter

RESEARCH OFFICE

210 Hulihan Hall
University of Delaware
Newark, Delaware 19716-1551
Ph: 302/831-2136
Fax: 302/831-2828

DATE: October 12, 2018

TO: Laura Sahd
FROM: University of Delaware IRB

STUDY TITLE: [1297614-1] Barriers to Cooking and Culinary Confidence Among College Athletes

SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS
DECISION DATE: October 12, 2018

REVIEW CATEGORY: Exemption category # (2)

Thank you for your submission of New Project materials for this research study. The University of Delaware IRB has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will put a copy of this correspondence on file in our office. Please remember to notify us if you make any substantial changes to the project.

If you have any questions, please contact Nicole Farnese-McFarlane at (302) 831-1119 or nicolefm@udel.edu. Please include your study title and reference number in all correspondence with this office.