A Qualitative Examination of Food Choice Among Division III Student Athletes Using Grounded Theory

by

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ABSTRACT

The determinants of food choice among the general population have been extensively investigated, but studies of food choice in collegiate student athletes are limited. Student athletes make food choices daily, and the selection of foods is an integral part of an athlete's training regimen. National Collegiate Athletic Association (NCAA) Division III (DIII) student athletes are a comparatively unstudied population, particularly in terms of their food choices; therefore, assessing and understanding the influences of food choices in this population can enable and support optimal eating behavior. To assess different determinants of food choice in athletes, this qualitative study developed a theoretical model explaining the determinants of food choices in DIII student athletes. Using constructivist grounded theory methodology, this study identified the relevant factors influencing student athletes' food choices and improved the understanding of the processes involved in food choice and athlete eating behavior. By uncovering the determinants of food choice in this population, this study expanded the construct of food choice while also helping to support the current healthful eating behavior of collegiate student athletes.

Keywords: Food Choice, Eating Behavior, Student Athlete, Sports Nutrition, NCAA

Dedication

This dissertation would not be possible without my family, both past and present, and this is dedicated to them. I am truly thankful to my beautiful wife Shelby Craig, whose unwavering love and support made it possible to complete this journey. I also want to dedicate this to my mother, Paulette Legg, and my father, Jeffrey Craig, for supporting me throughout life and being my biggest cheerleader.

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List of Abbreviations

American College of Sports Medicine (ACSM)

Athlete Food Choice Questionnaire (AFCQ)

Disorder Eating (DE)

Eating Disorder (ED)

Grounded Theory (GT)

Institutional Review Board (IRB)

Low Energy Availability (LEA)

National Collegiate Athletic Association (NCAA)

Food Choice (FC)

Chapter One: Introduction

Overview

The overarching purpose of this research study is to find the major determinants of food choice in Division III student athletes, with the intention to build upon the theoretical modeling that currently exists in literature. This introduction will serve as a basis for conducting the research, and the sections describing the need for the study, the background, and the statement of the problem will contextually stratify the study's purpose. This chapter will also further describe the purpose of the study and the associated research questions. Lastly, this chapter will give an overview of the methodology and define the key terms and limitations.

Need for the Study

During the last decade, the American College of Sports Medicine (ACSM), the American Dietetic Association, and the Dietitians of Canada have recognized the importance of following nutritional guidelines for both performance and health (Klein et al., 2021; Abbey et al., 2017; Zuniga et al., 2017). Sports nutrition, as conceptually defined by the ACSM (2016), is the intake and knowledge of nutrition-related factors enabling health and performance, and recovery from sport. Specific nutrient needs for athletes vary based on the physiological requirements of the sport, and as literature suggests, tailoring sports nutrition recommendations is critical for health and performance (Thomas et al., 2016; Tam et al., 2019.

College student athletes are a unique population, as findings highlight that nutrition misconceptions and the incongruities between an athlete’s knowledge and eating behavior can impede on following sports nutrition recommendations (Abbey et al., 2017). The term “student athlete” was originated by the National Collegiate Athletic Association (NCAA) in the 1950s and describes those who take part in NCAA regulated varsity sports while attending an

associated college or university (NCAA, 2019). The NCAA is the primary legislative body for collegiate sports, and ensures the nutritional needs of student athletes, as well as the academic, financial, and social challenges of the collegiate sports environment (Brown & Tenison 2018). Student athletes inherently meet numerous barriers which inhibit their ability to meet their nutrient needs, including deficits in nutritious food choice, restricted food intake, or excessive exercise training (ACSM, 2009). Incorporating healthy eating behavior is critical for nutrient needs (Eck & Byrd-Bredbenner, 2021), as student athletes must be active participants in selecting recommended foods. While the bulk of research on eating behavior and food choice is studied through an interdisciplinary framework of varying disciplines including nutrition, psychology, and marketing, this does not specifically identify influences of food choice in the collegiate context (Bentley et al., 2021).

When athletes do not meet recommended energy needs for health and performance, a condition termed low energy availability (LEA) can develop due to the low consumption of energy intake compared to the inherent energy expenditure of sport competition and training (Mountjoy et al., 2014). In a study conducted on (n=20) NCAA Division II lacrosse players, the athletes were seen to have significant discrepancies between actual intake and their perceptions of intake, which resulted in less than recommended intakes of both protein and carbohydrates (Jagim et al., 2019). These intakes were compared to recommendations by the International Society for Sports Nutrition, which publicize the importance of increased nutrient intakes above recommended daily allowance (RDA), because of the higher energy needs for athletes (Jagim et al., 2019). Generally, the literature on the optimization of energy intake and sports performance makes it evident that LEA is detrimental to both athletic performance in the short and long term, but also deleterious to overall health (Mountjoy et al., 2014; Jagim et al., 2019). The examination

and understanding of what influences the food choice of student athletes would be beneficial for protecting such detrimental implications.

In recent years, NCAA Division I (DI) athletes have been the primary population of interest in understanding eating behavior, with little representation in the examination of lesser collegiate divisions (Eck & Byrd-Bredbenner, 2021). While DI athletes have considerable resources in nutritional support, from access to team dietitians and stipends to offset living costs, they have been shown to show poor eating behaviors from a lack of nutrition knowledge (Werner et al., 2022). By contrast, Division III (DIII) colleges have minimal resources dedicated to nutrition support, thus, athletes must make their own informed decisions on food and nutrition (Werner et al., 2022). There is little research exclusively examining the determinants of food choice in the DIII student athlete population, so this study sought to address this gap in literature. Examining all the necessary implications of food choice through a grounded theory based qualitative analysis was invaluable for building a theoretical model of food choice for athletes in this population.

Background

Consuming adequate nutrients through a healthy eating behavior is an empirical necessity for long-term health and involves the elaborate process of numerous food choice and intake decisions. Literature suggests that individuals make more than 220 food choices each day, including what, where, when, how, and how much to eat (Wansink & Sobal, 2007). Food choice has been shown to be multifactorial in nature, including both external and internal factors (e.g., taste, convenience, price), with more recent literature reporting a strong correlation based on food availability and food security (Mello et al., 2010). In addition to these factors, an

individual's requisite knowledge base on nutrition, as well as their family and personal beliefs, directly influence food choice (Contento et al., 2006).

The importance of proper food choice is particularly important in athletes, due to the greater energy and macronutrient requirements needed for performance (Thomas et al., 2016). This is especially true for student athletes, as several studies show that the maladaptive adjustments of adolescence and the transitions into the collegiate environment can result in detrimental health outcomes (Croll et al., 2006; Purcell et al., 2013). For many young athletes transitioning into college, it is marked as a time of personal and professional growth, however, leaving from the well-defined eating behaviors of the parental home can be emotionally challenging (Lane, 2013). The transition out of the parental home can elicit prominent levels of anxiety when student athletes face navigating their own eating behaviors and adjusting to the changes in environment (Lane, 2013). Thus, the challenges faced by student athletes in making food choices are salient within the collegiate context, and the nutrient and energy deficiencies in this population can have negative impacts on both athletic and academic outcomes but can also have negative implications for overall health (Abbey et al., 2017; Wall et al., 2010).

In college student athletes, one of the biggest contextual factors of food choice is the unique environment, where college increases the risk for not meeting nutritional recommendations, likely due to the scholastic requirements coupled with sport related commitments (Trakman et al., 2016). The inherent switch for many young adults transitioning from the parental home stands for a pivotal time in framing long-term eating habits and positive lifestyle behaviors (Papadaki et al., 2007). In addition, Armstrong & Kotler (2003) found that behaviors formed early in adulthood can have lasting effects throughout the lifespan.

Within the NCAA, the dichotomy of colleges breaks down into three divisions including

Division I, II, and III (DI, DII, DIII), where the larger universities are in the top tier DI division (NCAA, 2023).

The relative size and growth of DI sports is based on significantly higher operating budgets compared to DII and DIII colleges, and in terms of athletic population, the NCAA facilitates athletic scholarships in DI and DII, while not offered in DIII (Brown & Tenison, 2018). The delineation between divisions is quite clear, as DIII colleges have the lowest operating budget within the NCAA, while also occupying the most students because of the volume of participating institutions (NCAA, 2023) (See Figure 2).

Although DIII schools are approximately 40% of the total participating athletes in the NCAA, DI athletes have continually been the primary population of interest in sports nutrition research (Werner et al., 2022; NCAA, 2019). Therefore, developing a better sense of eating behaviors and determinants of food choice in DIII athletes is critical for the improvement of sports nutrition in institutions that lack adequate resources.

Despite the prominence of NCAA college sports and the apparent relationship between food choice and health, there is unambiguous evidence that further research is needed in exploring the determinants of food choice in DIII athletes. Recent research in the determinants of food choice is limited, as there is one study examining the food decisions of collegiate athletes, however, the population of interest was DI (Eck & Byrd-Bredbenner, 2021). The DI university studied was in the northeastern region of the United States, and the findings in this study were only generalizable for DI athletes, and thus, the results can only be extrapolated for this population. Further research is needed for athletes outside of DI and in other geographic locations. Additionally, there are several investigations into the food choice systems of specific collegiate athletes, including one qualitative study which explored the personal food choice

process of DII football players (Long et al., 2011). The researchers concluded that food choice can be explained using a theoretical model of personal food choice, but also insisted that further research is needed for a better picture of food choice and eating behavior within the NCAA population (Long et al., 2011). Many differences in lifestyle, environment, and college culture can be seen between collegiate divisions, and these differences may influence a student-athletes' food choices, but also contend with or enable the lasting ability of healthy eating behavior. In literature, the specific food choices of college athletes can lay the foundation for long term eating behaviors (Furst et al., 1996), so it is imperative to build upon the conceptual knowledge of food choice in order to elucidate new factors from the point of view of the athletes making these decisions.

Statement of the Problem

Evaluating and understanding the individual food choices of athletes is pivotal in supporting targeted interventions for improved eating behavior, as literature suggests a major problem amongst athletes in supporting optimal nutritional intake (Thomas et al., 2016; Pelly & Thurecht, 2019; Tam et al., 2019). In collegiate athletics, eating disorders (ED) and disordered eating (DE) are widespread, as research shows that between 12 to 57 percent of athletes contend with these abnormal eating behaviors (Montenegro, 2006). Eating disorders are clinically diagnosed eating behaviors including frequent dieting, binge eating, obsessive calorie counting, and chronic restrained eating that affect nearly 40 million people (about twice the population of New York) at least once in their lifetime (Hudson et al., 2007). At the subclinical level, these behaviors denote a disordered eating diagnosis, which is predominant in the collegiate athlete population (Milligan & Pritchard, 2006). In a large study of (n=1,445) collegiate student athletes, the discrepancy between the rates of abnormal eating behavior development were prevailing, as

38 percent of males and 58 percent of females were reported as having an increased risk for the development of disordered eating behavior, while 1 percent of men and 9 percent of women were actually diagnosed with an eating disorder (Johnson et al., 1999). For student athletes it can be hypothesized that the development of these eating behaviors can come from a myriad of contributing factors including the environmental pressures of college, poor self-esteem, and genetic factors (Milligan & Pritchard, 2006). As a result, research focused on finding the possible influences of these behaviors is essential. The literature is express on the detrimental psychological and physiological effects of eating disorders and abnormal eating behavior on the health of student athletes (Reinking & Alexander, 2005), reporting that even if an athlete does not fully meet the criteria for an eating disorder, disordered eating can have negative health outcomes including an increased risk for obesity, gastrointestinal disturbances, bone loss, acute/chronic malnutrition, and even death (Anderson, M, 2018). Though research specifically studying DIII student athletes is lacking within this field of eating behaviors, understanding the factors that influence food choice in this population can help detect early signs of abnormal or dysregulated eating behaviors at the subclinical level (Pope et al., 2015).

There is also a tremendous concern about diet quality in collegiate athletics, however, few studies have explored the determinants of food choice and the specific inferences in eating behaviors in DIII student athletes. Refined dietary recommendations are varied by type of sport, with strength athletes (e.g., track and field, gymnastics) requiring more protein, and endurance athletes (e.g., cross-country, swimming) requiring more carbohydrates (Rodriguez et al., 2009). Literature suggests athletes commonly do not meet these required recommendations because of the inherent energy demands of competition and the external environment, but especially in sports where weight reduction or “leanness” is desirable (Heaney et al., 2008). The frequency of

suboptimal energy intake and diet quality is increasingly high for athletes taking part in these "high risk" sports, or sports that require body weight standards (Sundgot-Borgen & Torstveit, 2004). For example, in a study conducted on female athletes (n=527) taking part in leanness sports, 75 percent of the athletes did not intake the recommended carbohydrates and only 9 percent met recommended caloric needs (Wollenberg et al., 2015). Similarly, male collegiate athletes (n=88) in weight conducive sports have been seen to primarily consume excessive amounts of total fat, saturated fat, and protein, but were low in fiber and carbohydrates (Abbey et al., 2017). Athletes who take part in these high-risk sports may follow abnormal eating behaviors to get and maintain the recommended physique, however, research examining the determinants affecting their food choices can help inform the understanding of which factors make the most difference in eating behavior (Heaney et al., 2008). Although research on the overall nutritional outcomes of college athletes is limited, there is still a problem in finding the determinants of food choice in differing levels of the collegiate athletic environment, specifically DIII. Limited studies examining the food choice of student athletes focus on DI athletes (Eck & Byrd-Bredbenner, 2021; Stanforth et al., 2014; Jagim et al., 2019), with one quantitative survey examining the food choices of first-year football players (Jonnalagadda et al., 2001). As a result, the food choice process of DIII athletes has not been sufficiently explored, and this study will aim to understand the determinants of food choice. The relevance of this study is related to the unsolved problem of inadequate eating behaviors amongst student athletes, and this researcher believes the data from this study will help promote healthier and more sustainable eating behaviors rooted in more efficacious food choices at the individual level.

This research study will serve to fill the existing gaps in literature by exploring the

specific determinants of food choice for DIII student athletes and the major influences on eating behavior. This study was conducted in a DIII university in the southeastern region of the United States, and student athletes' food choice and eating behavior were qualitatively assessed, and an associated theoretical model will be proposed. The results from this research uncover the larger determinants influencing athletes' food choices, which can be instrumental to coaches, athletic training staff, and other nutritional practitioners (Long et al., 2011). Given the nutritional issues in collegiate athletics, this study looked to navigate the complicated processes of food choice for the provision of sports nutrition improvement across the landscape of collegiate sports.

Purpose of Study

Therefore, the purpose of this grounded theory qualitative study was to examine the determinants of food choice in NCAA DIII male and female athletes, and to develop a theoretical model explaining the determinants of the food choice process used by these athletes. Additionally, this research study wanted to uncover the factors influencing the ability of student athletes to make food choices in congruence with sports nutrition guidelines. The purpose of developing a theoretical model is to offer a comprehensive view of factors influencing the way athletes assimilate the process of choosing foods. This model can elucidate the underlying factors of maladaptive and possible disordered eating behaviors, as well as provide specific factors that can be useful when developing nutrition interventions. At this stage in the research, the "determinants of food choice" will be defined as the collection of methods used for making food choices, including the careful balance of weighing activities of daily life, physical well-being, and societal relationships (Furst et al., 1996; Bisogni et al., 2002). A qualitative perspective was used to explore the key determinants of food choice in these athletes, through a constructivist grounded theory (GT) approach (Charmaz, 2014). This qualitative inquiry will extend the

understanding of student athletes' food choice and eating behavior, by allowing an in-depth exploration of all possible extenuating factors (Charmaz, 2014). The grounded theory strategy of qualitative inquiry is to inform theory in less widely researched areas and guides data analysis to shape theory not premeditated by existing theories in the literature (Charmaz, 2014). The purpose of taking a constructivist methodological approach is to explore the specific nature and meanings that influence food choice in these athletes, as well as the processes they engage in to figure out such choices (Charmaz, 2014). This research assumed the constructivist grounded theory perspective to explore the social phenomena of deciding food in the collegiate athletic environment, therefore, the purpose of this study is to examine the factors that influence a DIII athletes' food choices.

Significance of the Study

The long-term health of collegiate student athletes, especially in relation to health and performance, has gained increasing attention in literature from stakeholders including the athletes, their coaches, their families, and the NCAA (Manore et al., 2017; Heaney et al., 2011; Nascimento et al., 2016). The eating behaviors of DI student athletes is frequently reported in scientific literature, and while many athletes believe that proper eating behaviors is important for performance, studies indicate that their nutritional adequacy does not meet recommended requirements for sport (Dunn et al., 2007; Heaney et al., 201; Abbey et al., 2017). Research on (n=35) both male and female college athletes revealed that their overall eating behaviors do not meet sport nutrition recommendations, further citing multiple nutrition knowledge deficiencies as plausible causes (Hassapidou et al., 2002). Furthermore, the food choices and eating behaviors that are proven during the adolescence period in college can have lasting effects on eating behavior through adulthood (Mikkila et al., 2005); therefore, it is increasingly important to

examine food choice and the influences of these associated eating behaviors. The significance of this study's results may be important in informing DIII athletes, their coaches, and the contingent of stakeholders on the larger factors that make the most difference to adhering to recommended sports nutrition intake (Heaney et al., 2008). Research documenting and examining the determinants affecting food choices is also critical in advancing better intake, however, the relative importance of other determinants to eating in this population has not been professionally researched (Heaney et al., 2008). Therefore, this study will be aimed to find the specific determinants affecting food choice and the ability of student athletes to adopt eating behavior that is consistent with sports nutrition recommendations.

This study used the constructivist grounded theory approach to create and develop a theoretical model of food choice that can be applied across a wide range of athletes from various athletic backgrounds. To date, no studies have used such a qualitative approach on the determinants of food choice in this specific population, and it is assumed that this study will generate more opportunities for qualitative studies to gain more traction within this field of inquiry. The results from this study may also have practical implications for those providing nutritional support to collegiate athletes, by creating more targeted dietary interventions through the examination of the resulting theoretical model of food choice. A clearer and more in depth understanding of the complexity of food choice is critical for the improvement of overall eating behavior for lasting health (Bentley et al., 2021).

Research Questions

As Birks & Mills (2011) explain, the research questions for grounded theory investigations should focus on those experiencing the phenomenon and should be broad enough to allow for the yielding nature of the research method. The aim of this study is to examine the

multi-faceted determinants of food choice in DIII athletes and explore the factors that influence the ability of student athletes to make food choices. The central research question guiding this research is:

(RQ1): What are the determinants of food choice in NCAA Division III student athletes?

(RQ2): What factors influence the ability of athletes to make food choices in congruence with sports nutrition guidelines?

Overview of Methodology

Due to the limited study on food choice and eating behavior in collegiate student athletes, a quantitative methodology may be too limiting. Food choice and the associated eating behaviors fulfill more than a biological need, and research has tried to bridge the gap between unambiguous data and the multiple functions that food has in athletes' lives (Swift & Tischler, 2010). There are unexplained layers of food choice and qualitative research is the most proper, especially in health science research, to investigate and explain human behavior (Swift & Tischler, 2010). This approach reveals the how and why student athletes behave and choose foods in certain ways, and in fact, the bulk of emerging research in dietetics and nutrition is through this methodology (Swift & Tischler, 2010; Harris et al., 2009). The primary aim of this research is to add to the body of qualitative inquiries in collegiate sports, specifically for the DIII athletic population. Rather than stringently defining the determinants of food choice, this researcher will seek the meaning, participant feeling, and individualistic language of athletes in choosing food (Harris et al., 2009). It is my position as a researcher to bridge the gap between the complicated and multiple functions that food and eating behavior has in this population.

Before conducting the study, it is important for the researcher to clarify the philosophical assumptions supporting it, so data collection and analysis can be fully substantiated and relevant

in exploring the study's research questions (Carter & Little, 2007). For this study, since the researcher assumes the role of adjunct faculty for DIII athletes in the field of exercise science and nutrition, the research will assume a relativist ontological position (Creswell, 1998). This position accepts the experience of DIII athletes and the determinants of food choice to be socially constructed (Carter & Little, 2007), or influenced by external factors such as the athlete's environment and athletic culture. In addition, in congruence with my relativist ontological position, this research will assume an epistemic position in which findings will be produced through embracing subjectivity, rather than focusing on objective and positivist findings (Creswell, 1998). This epistemologically is known as constructivism, which emphasizes subjectivity and is a critical nuance for this study, because it acknowledges that different athletes will experience the collegiate environment differently, thus, varying the food choice determinants (Creswell, 1998).

This study also used an inductive approach when examining the determinants of food choice, in which the researcher considers the relationship between choice and behavior to be socially constructed (Creswell, 1998). This favors the process of inductive reasoning, where the findings are directly produced from the data itself, and data collection and analysis will be guided by multiple open-ended research questions (Willig, 2008). It is important to note the novelty in this approach, as earlier studies have investigated food choice determinants using quantitative research methods (Pelly et al., 2018; Tesema & Mohan, 2018; Pelly & Thurecht, 2019; Juzwiak, 2021). The research questions surrounding this study were focused on the examination of food choice in its context in the DIII collegiate setting, which employed a grounded theory methodology looking to construct a theoretical model on the determinants of food choice in this population. As literature suggests, the use of a grounded theory approach is

instrumental in the emergence of theories from concepts grounded in the descriptive results (Charmaz, 2020).

For this study, we sought to generate a theoretical framework in relation to the determinants of food choice, depicted as a model, using the constructivist approach to apply grounded theory for influences in DIII student athlete food choice (Charmaz, 2006). The experiences of multiple student athletes were explored according to his or her own reality, so this research used semi structured interviewing to construct theory from the data (Charmaz, 2006). With this approach, we assume that student athletes have differing determinants for choosing food, and the corresponding determinants are therefore influenced by their environment. The semi structured interview was developed based on earlier literature in sports nutrition, and loosely based on the Athlete Food Choice Questionnaire (AFCQ), which was the first tool investigating the influences of food choice specific to athletes (Thurecht & Pelly, 2021). The interview was pilot tested with student athletes who did not take part in the actual study, and the interview questions were reviewed by a panel of three experts in sports nutrition and qualitative data collection (Eck & Byrd-Bredbenner, 2021). Eligible student athletes who took part in this study will be DIII student athletes at a small, private, southeastern university, and the lead researcher conducted the interviews seeking the perceived eating behaviors and food choice influences in these athletes. The lead researcher closely followed interview questions to ensure validity and consistency in data collection. Questioning continued until data saturation occurred with a plausible theory of food choice in the DIII population (Charmaz, 2006). Data saturation refers to the underlying method of grounded theory, where the researcher must acknowledge when there are no new emerging concepts coming from the interview data (Birks & Mills, 2011). For this study, the lead researcher expected a representative sample of student athletes, however,

the initial purposive sample directed the collection and generation of data and is the initial data that researchers analyze (Charmaz, 2006). More details about the research design and implementation of the study's procedures will be provided in Chapter III.

Definition of Terms

The following definitions will apply to the proposed study for a more comprehensive understanding of the concepts and factors that will be presented throughout the research:

1. **Dietary Intake-** the specific nutritional composition and macronutrient energy content of an athlete's diet (Lombard et al., 2015; Moore-Schiltz et al., 2015)
2. **Division III (DIII)-** the largest division within the NCAA, consisting of colleges and universities that do not provide athletic scholarships to student athletes (NCAA, 2019)
3. **Eating Behavior-** actions and stages of food handling that contribute to different decision processes (Sobal & Bisogni, 2009).
4. **Eating Disorder-** clinically diagnosed eating behaviors including frequent dieting, binge eating, obsessive calorie counting, and chronic restrained eating (Hudson et al., 2007).
5. **Food Choice** – the steps used for making food choices, including the actions of balancing life, money, physical well-being, and social relationships (Bisogni et al., 2002; Furst et al., 1996).
6. **Sports Nutrition-** the application of practical daily eating focused on proper fueling for sports activity and improving athletic performance (Fink et al., 2006).
7. **Student-athletes-** Students who enroll in a college or university who take part in sport (Irick, 2016).
8. **National Collegiate Athletic Association (NCAA)-** the governing body of collegiate athletics (NCAA, 2019).

9. **Nutritional Inadequacy-** not meeting the Estimated Average Requirements (EAR) or the average daily nutrient requirements of 50% of healthy people in a particular life span (Murphy & Poos, 2002).

Limitations

Although this study offered new insights into the determinants of food choice and student athlete eating behavior, this study had limitations. The present study will purposively sample a small student athlete population from one DIII university, so interviewing student athletes from the same environment may have limited results on specific food choice determinants. This means the theoretical modeling of food choice in this athletic population may not be generalizable to similar athletes in different geographic locations. Also, the student athlete's self-selection to participate in the study may present as a limitation, as a student athletes' interest in the study could have biased implications. Additionally, since the lead researcher will conduct the interviews, this may impact the discussion with student athletes. Student athletes may subconsciously answer questions based on the nutritional background of the lead researcher, so this must be acknowledged as a potential limitation. The fact that this study is conducting research on student athlete food choice permeates a certain significance of the phenomenon, therefore, all who participate do so knowing the importance of the phenomenon (Burr, 2015). Student athletes who participate may view their participation as a positive or negative experience, and information on factors influencing their food choice and eating behaviors could be biased. Recall and self-report bias are often seen in interviewing where subjects provide socially desirable responses (Petroczi & Nepusz, 2011).

Summary

This qualitative research study looks to explore the determinants of food choice in NCAA

DIII athletes and the factors influencing the ability of athletes to make food choices in congruence with sports nutrition guidelines. This study will examine the various determinants influencing food choice and how these factors relate to the eating behavior of DIII student athletes. Furthermore, this study will examine the prevalence of possible disordered eating behaviors and implications of possible clinical eating orders. This research and its corresponding theory could be helpful for both coaches and sports staff collaborating with athletes and educating them on sports nutrition. In this grounded theory study, the model developed is considered heuristic, meaning, it will illuminate components of a process to aid in bringing into consciousness the tacit assumptions about food choice (Furst et al., 1996). Accordingly, this study may serve multiple stakeholders including coaches, athletic training staff, and most of all, student athletes, in the requisition of their eating behavior. Prior to this study, little research had been done on the determinants of food choices in DIII student athletes, therefore, this study can serve as a baseline for future studies to decide the best strategies for nutritional intervention in this population.

CHAPTER TWO: LITERATURE REVIEW

Overview

In this chapter, there will be a justification for the importance of determining the food choices of DIII student athletes and the significance of the study in collegiate athletics. There will be an overview of the theoretical frameworks previously used to determine food choice, and a description of the conceptual model guiding this research. There will also be a summarization of the current state of college athletics and issues with student athlete eating behavior, which will establish a foundation for examining the targeted demographic of DIII student athletes. The conceptualization of sports nutrition and food choice will highlight the fundamental impact that nutrition has on this population, and a synthesis of current studies involving food choice among the collegiate divisions will provide literature support for the research topic. In addition, factors determining food choice will be found and discussed to further contextualize the topic in the collegiate environment, and the current approaches for exploring food choices are discussed.

Theoretical Framework

Examining the determinants of food choice and eating behavior in DIII student-athletes can aid in the development of nutrition interventions, which are more efficacious when based on sound theory and reasoning (Michie at el., 2015). Understanding the determinants, influences, and motivators of food choice is a necessity in understanding how these components affect student athlete eating behavior. Student-athlete food choice is dynamic and decided by a range of factors including the social and physical environment, and personal beliefs (McDermott et al., 2015). There are an assortment of theoretical and psychological models framing the intricacies of food choice including ecological models, the Theory of Reasoned Action (TRA) or Theory of Planned Behavior (TPB), and the Food Choice Process Model (FCP) (Furst et al., 1996). These

theoretical models are the most common approaches applied to specifically understanding food choice in literature. Given the small number of studies confirming the FCP Model for the study of food choice in athletes, this model will be used as the core theoretical framework for this research (Gorton & Barjolle, 2013). From reviewing the theoretical frameworks, conclusions can be drawn about the impetus for using the FCP.

Ecological Frameworks

Ecological models have been traditionally used as frameworks for understanding individual and social behaviors within environmental contexts, with the goal of reducing and mitigating negative health behaviors (Sallis et al., 2015). The USDA Dietary Guidelines for America uses an ecological model to elucidate deviations in eating behaviors by exploring the relationships between individual, environmental, and social determinants (USDA and DHHS, 2010; Story et al., 2008). One ecological model, the Social Ecological Model (SEM), proposes that individual behavior forms by multiple factors including community, institutional, and policy derived levels (McLeroy et al., 1988). Contrary to most theories in food choices, which focus solely on intrapersonal factors, the SEM and its variables can elucidate significant predictors of choice beyond these personal factors (McLeroy et al., 1988). However, while the SEM is widely accepted in literature, it should be noted that researchers rarely can explore each level of its framework (intrapersonal, interpersonal, institutional, community, policy), which impedes the analysis of a health behavior decision (McLeroy et al., 1988). The ecological models of food choice involve diverse levels of influence beyond the individual including the social and environmental factors, which has strong correlations with determining food choice where the food environment enables the behavior of healthy eating (Story et al., 2008). The food environment can be defined as the collection of sociocultural, economic, and physical conditions

directing food choices and nutritional status (Swinburn et al., 2013). For this study, the food environment is contextualized as the DIII collegiate environment where student-athletes must navigate the availability, convenience, accessibility, and affordability of healthy foods (Swinburn et al., 2013). While an ecological model of food choice illuminates the importance of understanding a student-athlete's environment, other theoretical approaches have heavily emphasized the influences of food choice associated with food, the individual making the choice, and the mediated beliefs and attitudes held by the individuals (McDermott et al., 2015).

The Theory of Planned Behavior (TPB)

The Theory of Planned Behavior (TPB) is another theoretical model used to understand health specific behaviors such as food choice (Ajzen, 1991). The TPB framework revolves around behavioral intentions, with the assumption that the intention to change or behavioral intentions are the strongest indicators of behavior, with a stronger intent associated with positive behavior change (Ziegler et al., 2021). The constructs mediating the TPB are decided by an individual's attitudes toward the behavior, the subjective norms, and perceived behavior control (Ziegler et al., 2021). Karpinski and Milliner (2016) conducted a study using the constructions of TPB among Division II male and female student-athletes in finding barriers to healthy eating, and found that attitude was the most prominent influence, however, the authors expressed the need for further exploration in attitudes around nutrition. While literature expresses the significance of attitudes in dietary modification, the formation of student-athlete attitudes and their determinants of food choice may be explained in relation to their unique transitions, trajectories, and specific life courses, which is a component of the Food Choice Process Model (Furst et al., 1996). Understanding the nuances of student athlete food choice is needed through sound theory or concept, primarily due to the development of behavior change interventions

requiring a sound theoretical basis.

Food Choice Process Model

There is no single theoretical framework explaining the food choice process (Sobal & Bisogni,2009), however, the Food Choice Process (FCP) Model will guide this study (See Figure 3). This model was first developed by Furst et al (1996), which laid the foundation for examining the elaborate process of food decision making throughout a person's life course. Developed using a constructionist grounded theory investigation, the FCP model is based on an individual's variability in factors affecting food choice, which involves three revolving components that amalgamate to produce the sequences of food behaviors (Sobal et al., 2006). The life course, influences, and personal food systems of student-athletes are components central to the model, and each part can produce a myriad of sequential food behaviors (Sobal & Bisogni, 2009).

Life Course

The life course of a student-athlete is primarily concerned with the previous experiences with food choice decisions, but also considers the future decisions and anticipations of food behavior (Sobal & Bisogni, 2009). The cyclic nature of the life course is not merely a progression through life's stages like childhood, adolescence, and adulthood, moreover, the life course involves a more dynamic process of undulating stages that establishes a food choice trajectory through transitions, turning points, timing, and contexts (Devine et al., 1998). A food trajectory, in the context of the student-athlete, can be defined as the active strategy and approach for the expectations of future food decisions, which is based on major transitions and turning points in the life course (Devine et al., 1998). A student-athlete entering the collegiate environment undergoes the major transition of leaving the parental house where food decisions can be regulated, and as a result, the responding life course influences how they construct food

choices because of this environmental change (Sobal & Bisogni, 2009). Consequently, "contexts" in the FCP model involve the environments where individuals live, more specifically, the macro and micro level environments including the social, cultural, familial, and physical structures (Sobal & Bisogni, 2009). The conceptualization of life courses in student-athletes is a critical aspect of determining food choice with respect to past experiences, current situations, and future nutritional needs (Sobal & Bisogni, 2009).

Influences

In the FCP model, the term "influences" refers to the multifactorial determinants of food choice placed into five categories including cultural ideals, personal factors, resources, social factors, and present contexts (Furst et al., 1996). These categories interweave within the life course and assimilate with each other to shape the individual construction of food choice (Furst et al., 1996). A student-athlete's cultural ideals include the system of rules shaped by a group of people, in this case, the collegiate student athlete environment. As literature states, student-athletes are a unique population due to the cultural norms of following sports nutrition guidelines, and measuring both eating behavior and the determinants of food choice should apply to the individual culture and population (Sobal & Bisogni, 2009). Personal factors are those specific to an individual which include psychological factors (eg food preferences), physiological factors (eg genetic factors), and social factors (eg parental factors) (Furst et al., 1996). Resources are the transactional assets in buying food that individuals must navigate and consider when determining food choices, including all forms of capital and wealth (Furst et al., 1996). Social factors highlight the commensal units where most eating occurs, by people sharing variable food choice decisions in groups as opposed to individuals (Furst et al., 1996). Contexts are those more comprehensive environments shaping food choice, for instance, in student athletes the collegiate

environment provides the infrastructure influencing the specific foods eaten (Furst et al., 1996). Largely, the influences of the FCP are enduring and change during the life course, which also lays the foundation for the development of the personal food system (Furst et al., 1996).

Personal Food System

Student athletes develop a 'personal food system' during the span of the life course, which denotes the cultivated navigation and processing for food choice enhancing the cognitive decision-making and eating behaviors in particular settings (Sobal & Bisogni, 2009). The personal food system is a major part of the FCP model and involves identifying the factors a person must traverse through active and social negotiations related to making food choices (Furst et al., 1996). The FCP model further contends that the personal food system highlights the prioritization of certain choices based on their value in context (Furst et al., 1996). In a personal food system, Furst et al., (1996) found major values appropriate for food choice including sensory perceptions, monetary considerations, convenience, health, and nutrition, managing relationships and quality. Personal food systems are the intuitive processes in deciding food choice that approximate actual food behaviors, compared to more peripheral influences and the former life course (Sobal & Bisogni, 2009). The culmination of dietary changes over an individual's life course is situationally constructed and adapted to the contexts that build the personal food system, and this process is evolving for student athletes as they respond to new life course challenges in the collegiate environment (Furst et al., 1996). The FCP has been previously used in literature explaining the food choice process and eating behaviors of families, older individuals, and a small subset of athletes (Worsley, 2002; Bisogni et al., 2005; Bisogni et al., 2007), however, it has not been applied in the DIII student athlete population, especially in both male and female athletes.

The FCP will serve as the conceptual framework guiding this study, as it will find considerations to examine and consider as controls for the analysis of food choice. This model will offer a broad spectrum of factors deciding a DIII student athlete's food choice, and enhance the studies focus on other aspects of food choice with respect to findings already proposed in literature. Through the constructivist ontology of this grounded theory study, we will develop our own theoretical model based on the FCP to explain the determinants of food choice used by male and female DIII student athletes.

Review of Literature

The College Student-Athlete and the State of College Athletics

Since its start in the early 1990s, the field of sports nutrition and the research into the eating behaviors of collegiate athletes has increased (Kerksick et al., 2018; Jagim et al., 2019; Trakman et al., 2016). The NCAA was set up in 1906 for male and female student-athletes to compete in collegiate sports, and the 1986 version of the NCAA Sports medicine handbook was published because of the importance of sports nutrition for college athletics (Parsons, 2014; NCAA, 2020). The term “student-athlete” describes those students who take part in a sport and are enrolled at a college or university within the NCAA (NCAA, 2020). The size of the NCAA is quite immense, with over 600,000 student-athletes divided into three participating divisions (Division I (DI), Division II (DII), Division III (DIII), spread across over 1,100 colleges competing in over one hundred different conferences (NCAA, 2019). Conferences are the smaller organizations within each division that regulate the competition schedule by region (NCAA, 2019). Data pulled from the NCAA in 2019 to 2020, reported that DI schools have over 180,000 student-athletes in four hundred colleges and universities, DII schools have over 130,000 student-athletes in over 300 colleges and universities, and DIII have the largest student-

athlete population with over 195,000 student-athletes within 450 institutions (NCAA, 2019). The NCAA divides into three divisions based on the school population, and the exorbitant DIII student-athlete population illustrates the need for this study to encompass this specific subset of collegiate athlete.

Aside from the enormity of the NCAA and the student-athlete population, recent studies (Divin, 2009; Chao, 2023, Nunez-Rocha et al., 2020) have suggested that student-athletes are a specific subset more likely to engage in unhealthy eating behaviors. These behaviors include skipping meals, binge eating, or purging, which can lead to unintentional weight mismanagement due to the dysregulation of eating (Divin, 2009, Pustivšek et al., 2019). Additionally, it is suggested that student-athletes have a higher prevalence in engaging with alcohol consumption and tobacco usage compared to those non-athletes (Divin, 2009, Pustivšek et al., 2019). Both male and female student-athletes aged from 16 to 24 years old are considered to be in the fundamental transition from post-adolescence to adulthood (Arnett, 2000), and as a result, research in this transient period indicates that individuals develop a more profound sense of making independent decisions and choices for themselves, primarily because of the age range and the feeling of freedom from parental control (Arnett, 2000). Given the importance of these choices in lasting health behavior, this study is specific in looking at dietary food choices and the factors influencing choices in these emerging adults, as there are indications that irregular eating behavior and low food intake can lead to low body mass index (BMI) and increase the association with mortality, morbidity, and institutionalization (Keller, 2007; Payette, 2005).

The Collegiate Environment

Although there is a myriad of extenuating circumstances perpetuating an athlete's eating behavior, the collegiate sports environment is one determinant specifically explaining why a

student athlete may show poor eating behaviors (e.g., environmental influences) (Thurecht & Pelly, 2020; Werner et al., 2022). The NCAA issued dietary guidance for colleges in 1991, with the intent to allow institutions to provide student-athletes with one meal per day because of the positive correlations with healthy dietary food choices and performance (NCAA, 2019). This initial guidance was implemented with the student-athletes nutrition in mind, as a means of achieving the recommended dietary requirements, while also detracting institutions from conducting fraudulent practices like extravagant dinners and unsanctioned supplement use (Buell et al., 2013). The NCAA endorsed a "food-first" approach, where necessary food choices were advocated over the use of nutritional supplements, in efforts to protect student-athletes from potential doping and advancing recommended dietary practices (Buell et al., 2013; NCAA, 2019). Within the updated nutritional guidelines published by the NCAA in 2014, DI universities had permission to supply student-athletes with dietary products limited to carbohydrate enhancement products (ie., drinks, bars, boosters), protein supplements, and those including omega-3 fatty acids (Buell et al., 2013). As of 2015, DII universities adopted similar meal legislation, allowing colleges to provide student athletes with snacks and unlimited meals in competitive season (NCAA, 2023). Finally in 2020, the NCAA allowed DIII universities the ability to provide only snacks to athletes following athletic competitions (NCAA, 2023). Despite these targeted nutritional implements within the collegiate environment, several studies suggest that the student-athlete population may still practice poor eating habits and food choices because of the inherent nuances of the collegiate environment, including the demanding competitive schedule and limited nutrition support between divisions (Abood et la., 2004; Rosenbloom et al., 2002; Smith-Rockwell et al., 2001).

Nutritional Support in Collegiate Athletics

During the last decade, the number of nutrition support staff including full time registered dietitians (RDs) have more than quadrupled because of the recognized importance of following sports nutrition recommendations (Klein et al., 2021; Thomas et al., 2016; Riviere et al., 2021). Since the NCAA's regulatory guidance on providing food to student athletes in 2014, the increase of sports dietitians has grown exponentially, as well as research assessing the nutritional inadequacy of collegiate student athletes' eating behaviors (Klein et al., 2021; Thomas et al., 2016;). Sports RDs are empirically known to help improved dietary outcomes in this specific population; however, the NCAA does not extend employment of these nutrition support staff to DIII universities (NCAA, 2019; Klein et al., 2021). While DI athletes have been seen to show inadequate eating behavior despite these provisions, most DI universities have the expanse of resources to nutritional support athletes (Klein et al., 2021; Thomas et al., 2016; Riviere et al., 2021). To the contrary, DIII universities cannot support their athletes because of the limited resources available, which places a greater emphasis on student athletes making self-informed decisions about food.

Differences within NCAA Divisions

There are stark differences in the student-athlete experience between the divisions of the NCAA, specifically between DI and DIII institutions and their nutrition support for their respective student-athletes (Griffith & Johnson, 2002). DI schools are the larger, more profit generating institutions awarding student-athletes with scholarships, while DIII schools award athletic scholarships based on merit and financial need (Griffith & Johnson, 2002). During their years of athletic eligibility, DI athletes may enjoy the benefits of athletic scholarships including money and per diem benefits for food, which makes healthy food choices more financially

practical, however, DIII student-athletes are not in this category (Humphreys & Mondello, 2007). Typically, the less profit generating and minimally funded DIII universities have little resources to provide sport nutrition programming or services, and as a result, there is a considerable evidence base supporting the employment of specific dietary strategies for these students (Thomas et al., 2016; Kreider et al., 2010; Humphreys & Mondello, 2007). The NCAA supports the practice of sound eating behaviors for all student-athletes; however, the eating habits and experiences of DI student-athletes vary immeasurably compared to those in DIII (Griffith & Johnson, 2002).

Eating Behavior in Collegiate Athletics

The literature examining the eating behaviors of collegiate student-athletes is limited, with the largest segment of this research focused on DI athletes (Trakman et al., 2016; Werner et al., 2022; Andrews et al., 2016; Judge et al., 2016; Hoogenboom et al., 2009). It should be noted that many DI institutions have vast resources in funding for both nutrition-related staffing and food budgeting, so it can be hypothesized that these student athletes make well-informed decisions about nutrition (Griffith & Johson, 2002). However, recent studies have examined the nutrition knowledge of DI athletes (Trakman et al., 2016; Werner et al., 2022; Andrews et al., 2016) and found that while many of these institutions have resources dedicated to providing nutritional support, the athletes have shown poor nutrition knowledge and inadequate dietary intakes. The phrase “nutrition knowledge” denotes the understanding of the diet-related factors that can affect athletic performance, training, and recovery from sport (Klein et al., 2021). Student-athletes with higher scores of nutrition knowledge are assumed to have improved eating behavior consistent with sports nutrition guidelines, however, a study by Torres-McGehee (2012) reported that only 9 percent of (N=185) student-athletes in DI scored higher than a 75%

on knowledge assessments of weight management, hydration, micro and macronutrients, and supplements for performance. This implies an inconsistency between nutrition knowledge and potential eating behavior, so research is needed for the DIII environment, as information on DI student-athletes cannot be automatically applicable because of the differences in nutrition support amongst divisions (Gomez-Hixson et al., 2022).

Research has also shown that DI athletes are consistently not meeting required caloric and macronutrient intakes (Thomas et al., 2016; Kerksick et al., 2018; Mountjoy et al., 2018), which questions their overall food choice and eating behavior. The gold-standard in sports nutrition information is the American College of Sports Medicine (ACSM), and its guidance is clear in the adequacy of caloric intake for the optimization of athletic performance, especially in the collegiate sports environment (ACSM, 2000). Further, it is emphasized that student-athletes have a greater requirement for energy, fluids, and macronutrients (carbohydrates, proteins, and fats) to support the physiological demands of the sports they play (Thomas et al., 2016; ACSM, 2000). However, studies suggest that collegiate student-athletes unsuccessfully meet dietary requirements because of increases in sports training, team travel, and academic scheduling (Thomas et al., 2016; Beermann et al., 2020; Magee et al., 2020; Logue et al., 2020). In a study of (N=138) collegiate athletes assessing overall diet quality, the Healthy Eating Index (HEI) (2005) was used to determine the diet quality of both male and female student athletes, and the results concluded that the average HEI score was 51.2 out of a possible 100 points, which correlated with higher body fat percentages amongst the sample of athletes (Webber et al., 2015). The study also showed a statistically significant difference (Males= 47.7 + 7.9 and Females= 53.1 + 8.6, $p<0.001$) in HEI scores and calorie intake between genders, as females report consuming less than recommended calories while males report consuming more than the

recommended calories (Webber et al., 2015). The HEI is a measurement tool often used to assess diet quality that complies with federally mandated dietary guidance and recommendations published in the 2005 Dietary Guidelines for Americans (Webber et al., 2015). Additionally, research has shown that female student-athletes are more susceptible to consuming inadequate calories, as one study by Anderson (2010) examined the dietary intakes of DI women volley players and found that they failed to meet the increased caloric energy demand while training and competing (Anderson, 2010). It is hypothesized that female student-athletes restrict their caloric intake because of the weight-bearing sports they play including gymnastics, cheerleading, swimming, and track and field, however, literature legitimizes the fact that low caloric intake and energy availability to be an enduring issue among female athletes across the landscape of sports (Rosenbloom et al., 2002; Zawila et al., 2003). Given the numerous studies examining the eating behaviors of DI student-athletes, particularly female athletes, this study plans to examine the food choice process of NCAA DIII male and female athletes. When examining the eating behaviors between genders, results are equivocal with slight variations reporting better results for women (Gilis, 2012). In terms of food choice and eating behavior, previous examinations have relied on the assessment of solely men or solely women without making gender comparisons (Judge et al., 2016; Hoogenboom et al., 2009; Shriver et al., 2013; Clark et al., 2003), and those that focused on gender differences in collegiate student athletes primarily focused on 1- or 3-day food recalls (Short & Short, 1983; Rash et al., 2008), and not through examining food choice and eating behavior through qualitative interviewing. This study will serve to gain a more comprehensive view of eating behaviors in the DIII population by assessing a broad spectrum of influences of food choice and other determinants of eating behavior between genders.

Sports Nutrition and Food Choice in College Athletics

The personal influences of food choice have been researched in the general population (Symmank et al., 2017; Stok et al., 2017; Steptoe et al., 1995), however, there are limited examinations in athletes (Pelly et al., 2022). Research has shown that student-athletes are typically suboptimal in nutrient intakes, especially with overall caloric intake (Spronk et al., 2014; Heaney et al., 2011; Webber et al., 2015; Shriver et al., 2013). Such inadequate food choice and eating behavior has potential for athletes to experience low energy availability (EA), which is the inadequate consumption of dietary energy to support physiologic function (Torstveit et al., 2018). By examining the relationship between the food choices of DIII student-athletes against current sports nutrition recommendations, this study will be useful in developing interventions for long-term health outcomes and sport-specific performance (Parsons, 2014).

The importance of sports nutrition and food choice are clear in literature (Symmank et al., 2017; Stok et al., 2017), however, to explicate the need for this study and the relationship between food choices and increasing sports nutrition, the term "sports nutrition" must be defined. While there are limited definitions of sports nutrition in literature, the general definition refers to the specific nutritional strategies that athletes should use before, during, or after training to maximize health and physical performance (Thomas et al., 2016). Fink et al (2006) notably defined sports nutrition as "the utilization of nutrition knowledge in practicing daily eating plans focused on providing efficient fuel for activity, facilitating the repair and rebuilding process following training, and optimizing athletic performance in sports, while also promoting overall health and wellness". To support the definition of sports nutrition and its importance in collegiate athletics, the influences of food choice are necessary to optimize the dietary intakes of the DIII athletes studied.

One critical aspect of sports nutrition and food choice for college student athletes is the evolution of their nutrition needs during their tenure in college, including the differences between eating behavior between training seasons, off-seasons, and in sports seasons. First-year student-athletes are just beginning their transition into college life, so learning to manage a new physical environment and disrupted time management may impede the ability to focus on food choices that provide energy for activity (Ketterly & Mandel, 2016). Additionally, as sophomores or juniors, the transition to potentially living off campus comes with the added responsibilities of grocery shopping, and by senior year, the impending end of their collegiate athletics career is the final transition until joining the public (Ketterly & Mandel, 2016). The sports nutrition recommendations uniquely shift between year changes, from preseason to in-season, and student athletes are tasked to navigate these dietary recommendations on their own, which likely leads to poor eating behaviors and food choices (Clark et al., 2003). The potential for making poor nutritional choices combined with the associated consequences of low caloric intake and low energy consumption make it necessary to find the determinants of food choice in DIII athletes in hopes to optimize their eating behaviors. While the precipitating factors for athletes who do not meet sport nutrition guidelines is likely compounded by taste, access, or convenience of food (Birkenhead & Slater, 2015), one hypothesized reason for the mismatch between meeting the recommended energy intakes from sports nutrition guidelines is poor sport nutrition knowledge, and especially food choice (Long et al., 2011).

Eating Disorders and Disordered Eating in Collegiate Student Athletes

Clinical eating disorders (ED) and subclinical disordered eating (DE) behaviors are problematic in the collegiate athlete population (Neglia, 2021), and have been classified as deadly mental illnesses (Chesney et al., 2014). EDs are considered clinically diagnosed eating

behaviors including frequent dieting, binge eating, obsessive calorie counting, and chronic restrained eating, and can be generally divided into 3 major subgroups including anorexia nervosa, bulimia nervosa, and eating disorder not otherwise specified (EDNOS) (Hudson et al., 2017). EDs have specific criteria for diagnosis, and the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) is used by qualified medical professionals to clinically diagnose an eating disorder (Torstveit, Rosenvinge, & Sundgot-Borgen, 2008). While EDs are clinically diagnosed conditions, it is important to note the differences from DE, which is a phrase that relates to abnormal eating behaviors and is not a clinical diagnosis (Torstveit, Rosenvinge, & Sundgot-Borgen, 2008). While many student athletes can show abnormal and clinically relevant eating behaviors without the diagnosis of an ED, DE can cause physiological and psychological damage over the lifespan (Chesney et al., 2014).

The prevalence rates of ED and DE in the athlete population are increasing, especially with research focusing more heavily on female athletes in general, likely because of the risks associated with engaging in dysregulated weight control measures compared to males (Milligan & Pritchard, 2006). The prevalence rates of ED amongst female athletes ranges from 3.2 to 19 percent across sports (Fewell et al., 2018; Joy et al., 2016; Abbott et al., 2021), with more recent literature reporting a progressive increase of ED prevalence from 20 to 28% in female athletes (Sundgot-Borgen & Torstveit, 2010). There is also literature suggesting that female athletes who take part in leanness sports (Wells et al., 2015), athletes taking part in aesthetic sports (Beals & Manore, 2012), and females participating in non-lean sports (Milligan & Pritchard, 2006) are at an increased risk for DE. There does appear to be a gap in literature on the DE prevalence in male collegiate athletes, as there is some evidence that ED and DE behaviors are also common in male athletes (Chatterton & Petrie, 2013; Petrie et al., 2008). In one study, male collegiate

athletes (N=203) completed the Questionnaire for Eating Disorder Diagnosis (QEDD; Mintz, O'Halloran, Mulholland, & Schneider, 1997), which is a self-reported questionnaire used to stratify the risk for DE behaviors (Petrie et al., 2008). The study found that while none of the sample was clinically classified as having an ED, almost 20 percent presented binge eating and pathogenic weight control behaviors that can be recognized as symptomatic for ED (Petrie et al., 2008). While 80 percent of the sample was asymptomatic for an ED, 14.2% used fasting and dieting as a secondary means for controlling weight, which can increase the risk for DE behaviors, especially due to the collegiate sports environment (Petrie et al., 2008). In a similar study using the QEDD in determining the prevalence of DE in male collegiate athletes (N=732), the results indicated that generally, most eating behaviors were consistent with a subclinical diagnosis of DE behaviors, with athletes using dieting as the most common method of weight control, and male athletes who participate in weight class sports having pathogenic eating behaviors that are symptomatic of DE (Chatterton & Petrie, 2013). The results from both studies combined to show that 16 to 19 percent of the sampled male collegiate athletes displayed DE behaviors, which were comparable to the percentages in female athletes (Sundgot-Borgen & Torstveit, 2010).

While this study is not looking to diagnose clinical EDs, examining the determinants of food choice and identifying eating behaviors in this population can help identify student athletes at risk. The early detection of DE behaviors can decrease the likelihood of developing a clinical ED, as risk factors for these behaviors are classified as genetic, psychological, and sociocultural (Milligan & Pritchard, 2006). The collegiate athletic environment can be considered a negative sociocultural risk factor when emphasis is placed on shape, body type, and the requisite performance of the athlete (Milligan & Pritchard, 2006), and the development of an ED can

critically impact a student athlete's mental, emotional, and physical health (Chatterton & Petrie, 2013).

Assessing ED and DE behaviors are extremely difficult and delicate to learn, however, self-report questionnaires have been used in the athlete population to show prevalence rates (Pope et al, 2015). The QEDD is a questionnaire confirmed for the collegiate student athlete population and has 50 self-report questions assessing DE behaviors using the DSM-V criteria (Mintz et al., 1997). There are some studies assessing DE prevalence using the QEDD (Chatterton & Petrie, 2013; Petrie et al., 2008), however other studies have used the Eating Attitudes Test (EAT), which can have either 26 or 40 item versions (Pope et al., 2015; Lane et al., 2004; Orbitello et al., 2006). The EAT has been confirmed and been shown to produce reliability in collegiate athletes, and primarily focuses on questions pertaining to DE behaviors including self-induced vomiting and binging (Pope et al., 2015). While these questionnaires have been used as assessment tools for ED and DE in the collegiate population, these prevalence rates can only be estimated, as literature explains that self-report questionnaires are not a reliable source of data collection (Beals, 2004). In fact, Beals (2004) recommends that individual interviews with licensed and medical professionals are the most necessary practice for the early identification of DE behaviors.

For this study, the use of interviewing will be used as the primary means for deciding the student athlete's influences of food choice, however, screening will be used as an instrument to find possible eating disorder behaviors and further inclusion in the study. There are no basic ways of finding EDs due to the variability of the symptomologies that exist, and the ability to apply a questionnaire for detection requires a specialist interpretation and can be quite lengthy (Morgan et al., 2000). As a result, a brief eating behavior questionnaire will be emailed to each

potential participant. This questionnaire will be used as an instrument to raise awareness of the possibility of DE behaviors among those with positive scores. Further explanation of this screening tool will be included in the procedures for data collection in Chapter 3.

Conceptualization of Food Choice

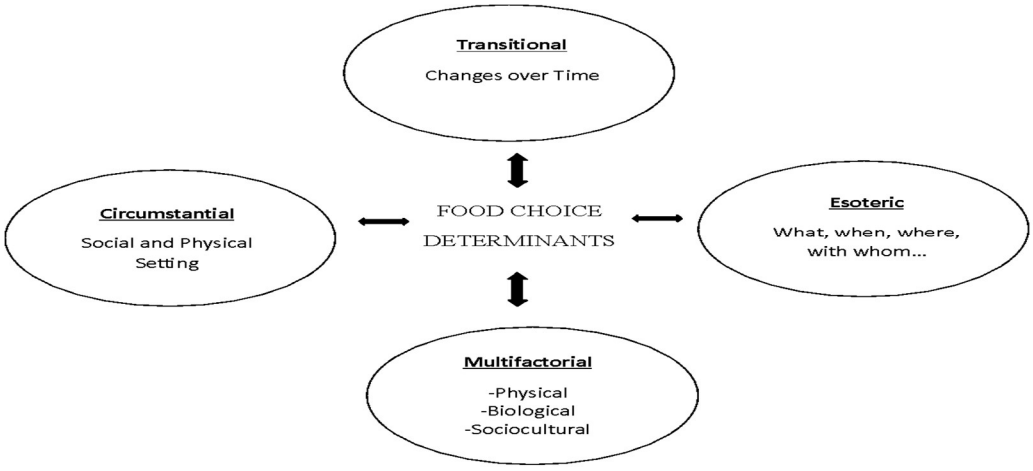
Student athletes make food choices often in hopes to provide enough nutritional support for daily living and health, as studies show that an individual has generally over 220 food choices during a typical day (Wansink & Sobal, 2007; Furst et al., 1996). Food choice can be defined as the systematic process of acquiring, preparing, distributing, and consuming foods and beverages (Sobal et al., 2009), and has been classically considered the "tyranny of choice" because of the numerous opportunities for making food choice decisions (Schwartz, 2004). Student athletes must navigate multiple eating and drinking occurrences every day, and each eating event requires specific food choices including what, where, when, with whom, how, and how much to eat (Sobal, 1999; Longnecker et al., 1997). Since eating and food choices are an inherent part of everyday life, research insists that the conceptualization of food choice to be an important and salient issue needing to be addressed with constant study (Sobal & Bisogni, 2009).

Many of the factors influencing food choice in student athletes are congruent with those in the general population, and understanding these determinants can be an integral part of why healthy food choices are not being made (Thomas et al., 2016; ACSM, 2000). There have been a variety of disciplines trying to understand the multifaceted factors influencing food choice, and because of the differing perspectives and research methods, these factors can become diluted and difficult to interpret (Sobal & Bisogni, 2009). Studies examining the food choices of athletes have been conducted in a variety of both qualitative and quantitative methods (Jaeger et al., 2011; Smart & Bisogni, 2001; Bisogni et al., 2007; Pelly et al., 2018; Pelly & Thurecht, 2019),

with the largest consortium of studies being qualitative and predominately with male student athletes from small samples (Jaeger et al., 2011; Smart & Bisogni, 2001; Long et al., 2011). The food choice decisions of student athletes are limited in literature, however for this study, we will conceptualize and define food choice as transitional, esoteric, multifactorial, and circumstantial (Sobal & Bisogni, 2009). Based on the conceptualization of food choice and the Food Choice Process Model guiding this study, Figure 4 represents how food choice applies to student athletes.

Figure 4

Conceptualization of Food Choice



Food choices are transitional, as student athletes' food choices change over historical and individual time, and from adolescence to young adulthood (Bisogni et al., 2007). Food choices are esoteric because of the many complexities involved in what, when, where, and with whom to eat (Bisogni et al., 2007). Food choices are multifactorial as student athletes integrate the physical, biological, and sociocultural factors of the collegiate sports environment (Bisogni et al., 2007). Food choice is circumstantial because of the specific context and settings involved in both the student athlete and the institution (Sobal & Bisogni, 2009). These four dimensions will help with conceptualizing the food choice process in student athletes, as this study will focus on

broadly examining food decision making as a multifactorial, transitional, esoteric, and circumstantial activity. It is important to note that there are no single terms or phrases broad enough to fully capture the enumerate factors involved in eating and food related decision making, however, this study will frame "food choice" through these parameters (Sobal & Bisogni, 2009).

Food Choice is Transitional

Food choice is transitional, as the decisions made by student athletes in earlier periods of life is proposed to be innately different than those faced today and, in the future (Doucerain & Fellows, 2012). The word "transitional" is used to stand for the facets of food choice that dynamically change over the course of time (Doucerain & Fellows, 2012). It has been shown that children develop their food choice by learning and accumulating constructs from parents and those in their immediate surroundings as they age, and these choices are fluid during the life course (Birch, 1999). A major life course transition is from adolescence to young adulthood, where a major decrease in the consumption of fruit and vegetables can be seen in both males and females (Stok et al., 2018). The transitional life course of a typical student athlete is generally considered to be a low-risk period for health-related issues, however recently, emerging adulthood has been associated as being a critical period for health risks and weight mismanagement (Deforche et al., 2015; Nelson et al., 2008). The prevalence and increase in overweight and obesity are larger among emerging adults than any other age group, which has been hypothesized to be due to negative food related behavioral patterns (Deforche et al., 2015; Nelson et al., 2008; Finlayson et al., 2012; Niemeier et al., 2006). The dietary patterns existing in student athletes is shaped by the changes in eating behaviors and food choice during this transition period, and as this study posits, conceptualizing food choices as "transitional" is of

crucial importance to gain a better understanding of the factors driving food choice during this critical life stage (Finalyson et al., 2012).

Food Choice is Esoteric

The complexity of involving a myriad of considerations about what, when, where, and with whom to eat makes food choices definitively esoteric in nature (Bisogni et al., 2007). Esoteric food choice can be defined as the system of beliefs and practices associated with food choice that are not commonly understood (Jung, 2014). Conceptualizing food choice as "esoteric" goes deep within the depths of a student athlete's collective unconscious, and digs into the inherited experiences, memories, and knowledge of food choice in the subconscious (Jung, 2014). When a student athlete decides what to eat, there may be a simple choice between foods like burger or pizza, or a selection of many alternatives like a buffet, and even considerations involving judgement and preferences like taste, cost, and health (Scheibehenne et al., 2007). When a student athlete decides when to eat, the choice to eat at once or not eat anything encapsulates the esoteric relationship between past, present, and future food choices and meals (Falk et al., 2001). When a student athlete decides where to eat, they may consider a single setting like the dining hall on campus, or frequent a more suitable setting like a restaurant, fast food establishment, or cafeteria (Amiraian & Sobal, 2009). When deciding with whom to eat, student athletes may be more inclined to dine with teammates, which involves multiple food decisions making a joint decision (Medina, 2021). The esoteric nature of food choices is a challenge in the overall complexity of decision making which has been examined in the social and behavioral sciences, nevertheless, this conceptualization shows that food choice involves multiple, interrelated decisions (Sobal & Bisogni, 2009).

Food Choice is Multifactorial

Food choice is inherently multifactorial, as there are a vast variety of food behaviors involved in the decision-making process (Sobal & Bisogni, 2009). Eating behaviors are those actions and stages of food handling that contribute to different decision processes, for example, when a student athlete decides what to eat it is often correlated with a choice about where to locate the food and how to prepare it (Bisogni et al., 2007). For this study, we conceptualize food choice from the multifactorial indices of a student athlete's physical, biological, and sociocultural factors (Bisogni et al., 2007). From a physical perspective, student athletes' food choice is derived from the physical intent of buying food, where foods can be considered material objects offering value useful to food consumers (Yoo et al., 2006). From a biological perspective, student athletes have specific physiological needs associated with playing collegiate sports, but also have the requisite neurological capacity to seek those nutrients and ingest them (Thomas et al., 2016). From a sociocultural perspective, food choice can be linked using social markers of typical practices amongst a particular sect of people (Bisogni et al., 2007). These different but interconnected factors of food choice are conceptually understood to explain how student athletes balance food decisions based on personal, social, and environmental factors (Sobal & Bisogni, 2009).

Food Choice is Circumstantial

Food choice is circumstantial, as food choices are situationally constructed within the specific social and physical settings of student athletes (Sobal et al., 2010). Food choices involve actions not only about the decisions with eating food, but also decisions about situational aspects of food behavior such as time and location (Sobal et al., 2010). In circumstantial instances where meals are shared, athletes are reported to make food choices that are equal with influences from

what their teammates or peers chose to eat (Smart et al., 2001; Contento et al., 2006). Literature suggests that when faced with circumstantial factors, the implementation of recommended dietary practices is difficult when framing food choice and available options (Falk et al., 2001; Sobal et al., 1998). While the significance of circumstantial factors in eating and food choice have been elucidated by food choice researchers for decades, circumstantial variables in eating and food, both within student athletes and between them, is still less understood (Bisogni et al., 2007). Focusing on the determinants of food choice in DIII student athletes will expand the ability to move toward conceptually examining eating and food choice as a transitional, esoteric, multifactorial, and circumstantial activity.

Food Choice for the Collegiate Student Athlete (DI, DII, DIII)

Research into the eating behaviors and food choices of student athletes has been advised by the American College of Sports Medicine (2016), the Academy of Nutrition and Dietetics, and the Dietitians of Canada with the intention to improve health by expanding the implementation of established sports nutrition guidelines (Thomas et al., 2016; Karpinski & Miller, 2016). Student athletes devote approximately 30 hours per week attending to the rigors of their athletic commitments including sport specific training and practice, competing in games, and travel to and from competition, and as a result, these schedules challenge the success of food choices and adequate nutrition (Holden et al., 2018). There are stark delineations between NCAA divisions and their nutritional support for student athletes, however, because of the business of college sports and the pressures of athletic performance, student athletes struggle with their nutritional and academic balance (Lopes Do Santos et al., 2020). Every NCAA student athlete is presented with the challenges of playing sports and attending college, but the level of nutritional support each athlete receives varies widely based on their participation status in a particular

division (Lopes Do Santos et al., 2020). The NCAA boasts a “food first” approach and proportionality between students and their athletic experience, however, literature has shown that DIII colleges receive the fewest resources from the NCAA while also having the greatest proportion of athletes within the three divisions (Holden et al., 2018). Regardless of the nutritional advantages seen in DI, student athletes in DIII institutions face food choice challenges with a lack of nutritional support (Lopes Do Santos et al., 2020). The disparities between nutritional support among NCAA divisions may have huge implications on the factors influencing the ability to make food choices amongst student athletes, and this study will illuminate these specific influences in the DIII population.

Food Choice and Sports Nutrition Division I (DI)

At the Division I (DI) level, student athletes are considered the most elite athletes in college sports, as most DI athletes are recruited based on their athletic performance (NCAA, 2020). It can be hypothesized that these student athletes make food choices to better support their athletic ability, however, literature conflicts with this sentiment. In a study assessing the dietary quality among (n=89) DI student athletes, the diets consisted of prominent levels of cholesterol and sodium, with deficiencies in vitamin D and omega-3 fats (Sutliffe et al., 2019). In another study, over 90 percent of the (n=169) DI athletes studied had insufficient macronutrient intake, despite reporting their dietary intake being positive (Brauman et al., 2020). Additionally, Sutliffe et al. (2019) found that DI student athletes (n=89) in team sports including basketball, swimming, volleyball, and football had major discrepancies in achieving their daily caloric intake, with football missing the recommended calories by 843.57 kcals per day. From these studies it can be shown that food choice is imperatively important for collegiate student athletes as they are generally not meeting the sports nutrition guidelines for dietary intake. The

determinants of food choice in DIII student athletes can impart a valuable insight into the disjointed relationship between nutritional support and knowledge that is seen in DI athletes and their insufficiencies in dietary intake.

Food Choice and Sports Nutrition Division II (DII)

The literature on DII student athletes and food choice are severely limited, as most of the studies associated with nutrition research in a collegiate athletic setting are focused on DI colleges and athletes (Trakman et al., 2016; Werner et al., 2020; Andrews et al., 2016). There are major nutritional and environmental differences between divisions, so it can be hypothesized that DII student athletes have significantly different determinants of food choice than DI. In fact, in a study on the personal food choices of DII male football players, they reported processed sandwiches, pre-packaged foods, and microwaveable dinners as the preferred meals to consume before and after training (Long et al., 2011). These foods are not in congruence with ACSM sports nutrition guidelines to support athletic performance and health, so studying the influences and barriers of food choice to support adequate nutritional practices is paramount within the student athlete population. While the DII collegiate environment contrasts with DI and DIII in terms of nutrition support for athletes, family and teammates were reported to be the primary determinant of eating behavior in DII student athletes (n=201) (Quatromoni, 2008). This is an important distinction from DI, where student athletes rely on sports dietitians, coaches, and nutrition support staff to influence their dietary choices (Eck & Byrd-Bredbenner, 2021),

Food Choice and Sports Nutrition in Division III (DIII)

Among the three divisions within the NCAA, DIII universities have the largest student athlete population with an estimated 40 percent of total athletes across the NCAA (Jagim et al., 2019), however, there are limited studies on this subpopulation when compared to DI. Despite

the largest preponderance of participating athletes, DIII institutions have minimal resources to support nutritional services for their student athletes, so eating behavior and food choice may be more daunting for athletes to make (Jagim et al., 2019). In fact, for DIII student athletes, a study found that the influence for eating behavior and nutrition information came from 70% coaches and 63% athletic trainers (CPSDA, 2014). Where student athletes obtain their sports nutrition information plays a critical role in their food choices and ultimately how nutrition impacts performance and health (Thomas et al., 2016; Eck & Byrd-Bredbenner, 2021). For DIII colleges with minimal resources and nutrition budget, the dietary habits and food choices of these student athletes remain understudied. Most student athletes in DIII will never compete in professional sports or past collegiate eligibility, so nutrition intervention is necessary to help these athletes transition out of college (Torres-McGehee et al., 2012). Before sports nutrition recommendations can be made, it is vital to gain a thorough understanding of the determinants of food choice and eating behavior in this specific DIII population (Abbey et al., 2017).

Sports Nutrition Recommendations for Student Athletes

For student athletes, following sport nutrition recommendations is an imperative function as the American Dietetic Association, Dietitians of Canada, and the American College of Sports Medicine inform the recommended selection of food choices for both health and performance (Thomas et al., 2016). Under the recommendations from these preeminent organizations within sports nutrition, student athletes must prioritize the adequacy of energy intake, especially during periods of high intensity training (Thomas et al., 2016). LEA is a major obstacle to sports performance, and has been shown to increase fatigue, injury, and illness (Mountjoy et al., 2014). In terms of macronutrient energy intake, the carbohydrate recommendations for athletes range from 6 to 10 g per kilogram of body weight, protein recommendations range from 1.2 to 1.7 g

per kilogram of body weight, and fat intake should range from 20% to 35% of total energy intake (Thomas et al., 2016). If student athletes restrict energy intake, they are at a greater risk for macro and micronutrient deficiencies, which impedes the body's ability to support its necessary function.

Determinants of Food Choice

The process of eating and making food choices has been extensively researched over the last decade (Devine, 1998; Jaeger et al., 2011; Parraga, 1990; Furst et al., 1996), and there is a myriad of terms used to conceptualize the process of eating including feeding, nourishing, and consuming (Bisogni et al., 2007). Eating is synonymous with food choice, and food choice denotes the conscious and rational selection of food among available options (Bisogni et al., 2007). Some researchers take a biological approach in explaining food decision making, while others integrate a socially constructive approach (Bisogni et al., 2007; Furst et al., 1996). As literature indicates, there are no singular words or phrases to capture the magnitude of factors involved in food choice (Bisogni et al., 2007), however as this study defines, food choice involves the steps used for making food choices, including the actions of balancing life, money, physical well-being, and social relationships (Bisogni et al., 2002; Furst et al., 1996).

A major problem with understanding food choice is the multitude of research perspectives investigating this multifaceted issue from many approaches and paradigms (Devine, 1998; Jaeger et al., 2011; Parraga, 1990; Furst et al., 1996). This makes constructing a practical scope of food choice determinants difficult, as the main motive behind this study is understanding why DIII athletes make or do not make dietary choices in line with sports nutrition recommendations. Recently, the Determinants of Nutrition and Eating (DONE) was created by an interdisciplinary taskforce to decide the most frequent influences in nutrition and

eating across all populations (Stok et al., 2017). The DONE framework is thought to be the most comprehensive list of food determinants in literature, and it reports over 400 determinants of food choices, which are categorized into four socioecological tiers including individual, interpersonal, environmental, and political (Stok et al., 2017). The individual determinants of food choice include the biological, psychological, and situational determinants that factor into an individual's food choice, while the interpersonal determinants include the cultural and social influences (Stok et al., 2017). Additionally, the environmental determinants concern the micro and macro environments, and at the policy level, determinants from the government are the least studied (Stok et al., 2017). The DONE framework is the most established and inclusive framework that systematically maps the multifaceted factors of food choice, however, there is an extensive focus on the individual determinants in the general population, and less investigation of determinants in athletes (Stok et al., 2017). Athletes inherently have increased nutritional demands and make food choices like the general population, however, the requirements from sports nutrition guidelines will likely influence food choice more because of the role of nutrition on performance and recovery (Blennerhassett et al., 2019). In a narrative review conducted in 2015, athletes' food choices were collectively investigated from a limited number of studies, and the subsequent determinants of food choices of athletes were broadly summarized as biological and physiological, cultural, beliefs and preferences, demographic, education and nutrition knowledge, competition level, situational (cost, convenience, availability), interpersonal, and the food environment during competition (Birkenhead & Slater, 2015). Since the review in 2015, the proliferation of research examining the relationship between nutrition and diet quality in athletes has advanced (Tam et al., 2019; Tam et al., 2020), however, exploring the determinants of food choice remains an integral part of understanding eating behavior (Birkenhead & Slater, 2015).

Biological and Physiological Determinants of Food Choice

In the breadth of literature on food choice and eating behavior, the primary determinant of individual food choice is the need to fulfill the biological needs of hunger (Lowe & Butryn, 2007). When people are hungry, the natural biological function of appetite and satiety is an imperative motivator for food choice, which commonly supersedes the requisite factor of price and preference the more the person is food depleted (Hoefling & Strack, 2010; Furst et al., 1996). For student athletes, exercise may induce an increase in the physiological appetite and need for food, which may be the biggest determinant of food choice amongst this population according to literature (Long et al., 2011). While this may be true, further studies relating dietary intake and hunger are inconsistent (Deighton et al., 2013; King et al., 2013), showing that athletes can ignore physiological cues of hunger and delay nutrition to meet weight requirements or eat despite a loss of appetite (Pettersson et al., 2012).

Cultural and Belief Determinants of Food Choice

The shared attitudes and beliefs that shape a person's decision-making, in this instance food decisions, are held to be cultural determinants of food choices (Mak et al., 2012; Rozin et al., 1999). In the student athlete population, adolescence transitioning to young adults are often met with cultural differences in the unique food environment of college, as athletes around the world attend college from a myriad of diverse cultural backgrounds (Prescott et al., 2002). Some athletes coming from cultures with strong religious beliefs will make food choices commensurate with those ideals, whereas some cultural differences have no importance to the athlete (Nestle et al., 1998). The collegiate sports culture has an inherent belief and value in the sports performance aspect of athletics; however, the value of nutrition has not been recognized in literature (Ono et al., 2012).

Preference Determinants of Food Choice

In the collegiate environment, taste was concluded to be the primary determinant of food choice in a study assessing (n=405) college students and factors of food choice (Jilcott et al., 2009). Preference determinants of food choice have been studied in all demographics of athlete, and determinants such as foods smell, taste, and appearance factor into the food choices (Smart et al., 2001; Robins & Hetherington, 2005; Birkenhead, 2014; Pelly et al., 2018). While this may be more applicable in the athletic population, the preference determinants, and sensory applications of food choice, especially taste, have been shown to be sacrificed for the health benefits over the appeal to the senses (Smart et al., 2001). In a study of collegiate hockey players (*n*=10), the descriptive results confirmed that the players regarded low fat foods to be healthy and rewarding, but not satisfying (Smart et al., 2001).

Demographic Determinants of Food Choice

There are many studies indicating that women determine food based largely on weight and health issues (Chambers et al., 2008; Alkazemi, 2019), as it has been elucidated that women are more aware of their diet and more likely to choose foods based on health (Alkazemi, 2019). In assessing gender differences, Davy et al (2006) examined (*n*=286) college students and their food choice preferences and found that female students prioritized limiting fat and carbohydrate consumption for weight loss over male students. In another study examining the roles of gender and race in students' determinants of food choices in college, the sample of males (*n*=405) were found to choose food based on taste, cost, and food quality as determinants, also indicating that gender was a significant factor associated with preferentially determining unhealthful food (Boek et al., 2012). The literature on gender differences in food choice appear to explicate the greater weight control involvement and strong belief in healthy eating that female athletes have been

shown to exhibit (Boek et al., 2012; Wardle et al., 2004), however, understanding the ancillary factors that encourage male athlete's participation in healthy eating behaviors is needed (Wardle et al., 2004).

Nutrition Knowledge Determinants of Food Choice

The awareness of sports nutrition and the practical applicability of choosing healthy foods can be considered "nutrition knowledge", as this determinant has been seen to influence food choice (Furst et al., 1996; Worsley, 2002). Nutrition knowledge encapsulates student athletes' knowledge about sport-specific nutrition and their beliefs about nutrition and their role as an athlete (Worsley, 2002). A common intervention for increasing nutritional behaviors is through nutrition education, where nutritional knowledge is enhanced, and better food choices are made (Parmentar & Wardle, 1999). Studies have seen an increase in fruit and vegetable consumption with an increased nutritional knowledge in adults (Parmentar & Wardle, 1999; Wardle et al., 2000), however, the sport specific nutrition knowledge of student athletes is poorly understood (Harrison et al., 1991). Although literature suggests that athletes make better food choices with an increased nutrition knowledge, further investigation is needed as there may be ancillary factors contributing to food choice beyond just knowledge (Harrison et al., 1991).

Situational Determinants of Food Choice

The global food environment has seen a dramatic increase in food prices, and as a result, the cost of food, specifically healthier foods, is a great determining factor in food choice (Monsivais & Drewnowski, 2007). In the United States, a study conducted assessing the costs of foods in 2007, found the price of healthy energy-dense foods like fruits and vegetables increased in price by 19.5%, while unhealthy energy-dense foods like processed meats were decreased by 1.8% (Monsivais & Drewnowski, 2007). In more recent calculations, the cost of abiding by an

ideal healthful diet averages about $1.50 more per day, and several analyses have concluded that more healthy diets are more expensive (Daniel, 2020; Pechey & Monsivais, 2015; Tach & Amorim, 2015). In addition to literature expressing the effect of cost in the general population, college students also use cost and convenience as deciding factors (Driskell et al., 2005). Student athletes have time commitments with training and academics, so time and convenience may be limiting factors for food choice (Driskell et al., 2015). A student athlete's schedule with athletics and academics has been seen to be the primary barrier to healthy food choices as quoted by health professionals collaborating with elite athletes (Heaney et al., 2008).

Approaches for Determining Food Choice

Deciding food choice and eating behavior has been studied from a wide range of disciplines from nutrition, psychology, and marketing through focus groups, interviews, and surveys (Symmank et al., 2017). The interpretations drawn from these studies can diverge based on the philosophical and methodological underpinnings, however, each approach can bring a distinctive understanding of the determinants of student athletes' food choices (Symmank et al., 2017). When looking at food choices, research can be conducted through either quantitative or qualitative modes of inquiry. Quantitative approaches in food choice are usually conducted through surveys, while qualitative research uses interviews for research inquiry (Pelly et al., 2022). In literature, there are four quantitative studies (Birkenhead & Slater, 2015; Pelly et al., 2018; Heaney et al., 2008; Tesema & Mohan, 2018), three qualitative studies (Smart et al., 2001; Long et al., 2011; Robins et al., 2005), and one narrative review (Birkenhead & Slater, 2015) exploring the determinants of food choice and eating behavior in collegiate athletes. This limited research is justification for further exploration in DIII student athletes specifically, as earlier studies have been from single sport athletes and through a questionnaire approach (Birkenhead &

Slater, 2015; Pelly et al., 2018; Heaney et al., 2008; Tesema & Mohan, 2018). The use of quantitative questionnaires is an appropriate means of capturing objective samples and an analysis of factors against each other; however, qualitative studies provide a more detailed description of the determinants of food choice, through semi structured interviews exploring the lived experiences of student athletes and their food choices (Furst et al., 1996; Sobal & Bisogni 2009). We have found three quantitative survey instruments that were validated for athlete specific use in food choice during 2019-2020, and they include the Adapted Food Choice Questionnaire for ultra-endurance athletes (U-FCQ) (Blennerhassett et al., 2019), the Runner's Health Choices Questionnaire (RHCQ) (Stickler et al., 2022), and the Athlete Food Choice Questionnaire (AFCQ) (Thurecht & Pelly, 2019). The U-FCQ is specific to reflect the proposed factors influencing food choice in ultra endurance athletes, and results from the study concluded that only 38% of athletes chose foods necessary to sustain the energy provision for the sport (Blennerhassett et al., 2019). In addition, the RHCQ was given to male cross country student athletes to find factors influencing health and nutritional choices and found that runners report a diverse range of factors in food behavior, with performance enhancement being the largest contending factor (Stickler et al., 2022). These athletes balance the desire to be healthy with the individual preferences of performance. The AFCQ is the most applicable survey instrument that would be proper for DIII student athletes' food choice determinants, as this instrument was used and developed in two mixed sport cohorts (Thurecht & Pelly, 2019). While the AFCQ has construct validity and is a reliable instrument in the factor analysis of food choice, it still lacks the descriptive factors and context relevant to DIII student athletes. The DIII population, as implicated by this literature review, have unique institutional-related dimensions that influence food choices which may not be reflected in current literature (Thurecht & Pelly, 2020).

Therefore, because there is a validated means of measuring food choice motives in athletes, it would be possible to construct a new theoretical model based on previously validated measures. Although quantitative surveys are useful for informing objective factors of food choice, this study will use semi structured interviewing to collect detailed subjectivity and descriptions of food choices for DIII student athletes.

Summary and Integration

The existing literature surrounding food choice and eating behavior continues to expand in the sports nutrition field, and this literature review shows the lack of research amongst the divisions of collegiate athletics. The first outline of theoretical approaches was intended to create a foundation for understanding the issue of food choice as well as present the conceptual model framing this study. After comprehensively illustrating the inconsistencies among nutritional intake in student athletes, the research examining this population is centered primarily on DI athletes, with scant research around DIII student athletes. Interestingly, literature definitively reports insufficient nutrition knowledge among college student athletes irrespective of their division and other meaningful food choice factors such as gender or athletic sport. Based on the studies researched, it is still difficult to make a concrete determination on the finite determinants of food choice and eating behavior among student athletes. Nevertheless, this paucity of research is encouraging for further examination in the DIII environment as this research endeavors to add to the heterogeneity of findings across the field of studies in the collegiate population. The results from this study will be used to qualitatively inform theory on food choice and enable the requisite nutritional support and interventions to improve food choice among collegiate student-athletes.

CHAPTER THREE: METHODS

Overview

A more in-depth and descriptive examination of the determinants of food choice and eating behavior is needed to effectively address the gaps in research. Therefore, this study's purpose is to expand the knowledge and understanding of the food choice determinants of DIII student athletes. This chapter's purpose is to outline the methodological approach and design of this qualitative grounded theory examination of food choice. This approach will allow for a deeper understanding of DIII student athlete's experiences within the collegiate environment and provide for the development of theory from the descriptive results. The pertinence and suitability of grounded theory will be discussed in this chapter, along with the overall research plan including the methodology, the study population, procedures, data analysis and collection, and ethical considerations.

Methodology

Qualitative Approach to Food Choice

The extensive nature of food choice has been approached by a myriad of research disciplines, primarily through focus groups, interviews, and quantitative surveys (Spronk et al., 2014; Burkhart & Pelly, 2016; Bentley et al., 2021). In a scoping review of food choice, Symmank et al (2017) explains that food choice and eating behavior must be approached through a multidisciplinary lens, and each methodological approach can bring a novelty in understanding an athlete's determinations on food. When phenomena are difficult to measure beyond data, numbers, and controlled environments, processes must be examined, and rationale must be discerned from a different approach (Harris et al., 2009). As epistemologists agree, when research does not fit in this quantified approach, qualitative research is called for, which is also

proper in the applied science of nutrition and eating behavior (Harris et al., 2009). As a result, this study will use a qualitative method of research inquiry to collect rich, detailed descriptions of food choices that can be useful for examining the context of these constructions in DIII student athletes (Pelly et al., 2022).

Grounded Theory

As Creswell & Creswell (2017) have explained, quantitative methods are used to understand the connections between variables, however, a qualitative approach is necessary when trying to explain food choice from an individual's experience situationally. This qualitative study will be conducted using a ground theory approach, which is a respected way to move from individual knowledge of food choice to collective knowledge (Stake, 2010). Grounded theory was first introduced in the 1960s and is based on the discoveries of theory from the research data collected (Glaser & Strauss, 1967). As the creators of this methodology, Glaser & Strauss (1967) explain that theory can appear from research data by meticulously coding interviews with terminology that conceptualize each response. After the researcher extrapolates themes from the existing data and responses, the theory evolves and is constructed (Glaser & Strauss, 1967).

The grounded theory approach is a definitive means for creating theories, and this study will be undertaken through the ontological paradigm of constructivism (Furst et al., 1996). The development of theory and understanding the determinants of food choice aligns with constructivism, as this perspective acknowledges that there is not one, objective variation in experiencing reality, but rather, the world is subjectively constructed based on individual experience (Burns et al., 2022). Researchers who believe that reality is socially constructed, or lacking a single reality have a relativist ontology, which means the world is perceived by an individual's ideations and directly influenced by social factors including language and culture

(Swift & Tischler, 2010). The notional underpinning of deciding food is beyond conjecture, with no means to subjectively establish the relative influence of many determinants (Furst et al., 1996). As a result, approaching food choice from a constructivist position allows the human experience to be relative to the paradigm, influenced subjectively by society, culture, or other external determinants (Charmaz et al., 2018). Based on this study's research questions, this researcher is confident that the constructivist grounded theory approach will generate rich descriptions of food choice to help understand the DIII student athlete process of keeping eating behaviors.

For this study, an accentuation will be placed on the phenomenon of food choice and the reflective nature of the research as food choice theory evolves (Charmaz et al., 2018). Proper reflexivity on the emerging theory of food choice throughout the study will be important in guiding the research, as this researcher is aware of the nuances in uncovering distinct food choice determinants (Swift & Tischler, 2010). Reflexivity refers to a researcher's recognition of their role in the study, so, studying food choice determinants of DIII student athletes in their own realities helps claim the true nature of the phenomena (Swift & Tischler, 2010). Commensurate with the constructivist grounded theory approach, this research will incorporate the process of inductive reasoning, which infers the specific methods of data collection and analysis guided by open ended research questions (Swift & Tischler, 2010). For contextual data collection, the researcher will use predetermined, open-ended questions through semi structured interviews. Theoretically, this study's research design is aligned with the overall purpose of qualitative research to achieve an understanding of how athletes make sense of food choice and interpret their experiences through in-depth interviews. Along with qualitative interviews, numerous studies have also suggested the support of using screening tools to identify at risk behaviors

including food choice, which can contribute to adverse eating behavior (Kutz et al., 2020).

Research Questions

The purpose of this study is to build on the existing theory of food choice in answering the central research questions guiding this research:

(RQ1): What are the determinants of food choice in NCAA Division III student athletes?

(RQ2): What factors influence the ability of athletes to make food choices in congruence with sports nutrition guidelines?

Population

The setting for this constructivist grounded theory investigation will be at a small, private DIII university in the southeastern region of the United States. As depicted in Figure 6, in this population, there are 590 student athletes who participate in at least one sport, with 173 women and 417 men (MU Athletics, 2023).

Figure 5

Methodist University Student Athlete Population

	#Student-Athletes	#Undergraduate Student	#Basketball Student Athletes	#Tennis Student Athletes	#Soccer Student Athletes	#Lacrosse Student Athletes
Male	417	647	28	27	29	26
Female	173	801	16	20	29	18
Totals	**590**	**1448**	**44**	**47**	**58**	**44**

The nature of qualitative inquiry, especially through a grounded theory approach, is to seek and understand the world from the viewpoints of those who live in it (Creswell & Poth, 2016). In this setting, we will be able to capture the true essence and subjectivity of food choice by spending an extended period with DIII student athletes and their constructions from their own vantage points (Hatch, 2023). Student athletes are half of this university's student population, with only 1,448

students in undergraduate enrollment (MU Athletics, 2023). Through the mutually agreeable engagement of student athletes in this population, the researchers and respondents can construct the subjective reality of food choice and the influences that are under investigation (Hatch, 2023).

Participants

A purposive sample of DIII student athletes was used in examining eating behavior and food choice for this study. In constructivist grounded theory, purposive sampling is the first process that directs the initial generation of data, and researchers purposefully choose participants who can directly answer the research questions (Creswell & Poth, 2016). We purposefully sampled student athletes to decide the influence of food choice in building theory, as it is commonly recommended to plan for over 30 participants to fully develop patterns and dimensions of the given phenomena (Hatch, 2023). In general, Crewell (2007) recommended that an adequate sample includes 20 to 30 subjects to induce a quality theory. To ensure that a reasonable representation of all student athletes in the DIII population was covered, the sample consisted of both male and female athletes, from each class level, and from each major sport in which both genders are well represented (basketball, tennis, soccer, lacrosse). DI collegiate basketball players have been found to consume inadequate nutrients to support recommended amounts for in season play (Nishisaka et al., 2022), and Juzwiak (2008) reported that tennis players had nutritional deficiencies in carbohydrate and micronutrient intake. Likewise, the mean protein and carbohydrate intake of collegiate soccer players were negligible (Danielik et al., 2022), and studies conducted on female lacrosse players reveals inadequate nutritional intake and underestimated perceived intake of carbohydrates and fats when compared with perceived needs (Jagim et al., 2019; Zabriskie et al., 2019). The initial data from this opening sample was

collected and analyzed, and as the theory began to emerge, the coding and constant comparison analysis for the data further developed the theory of food choice (Charmaz & Thomberg, 2020).

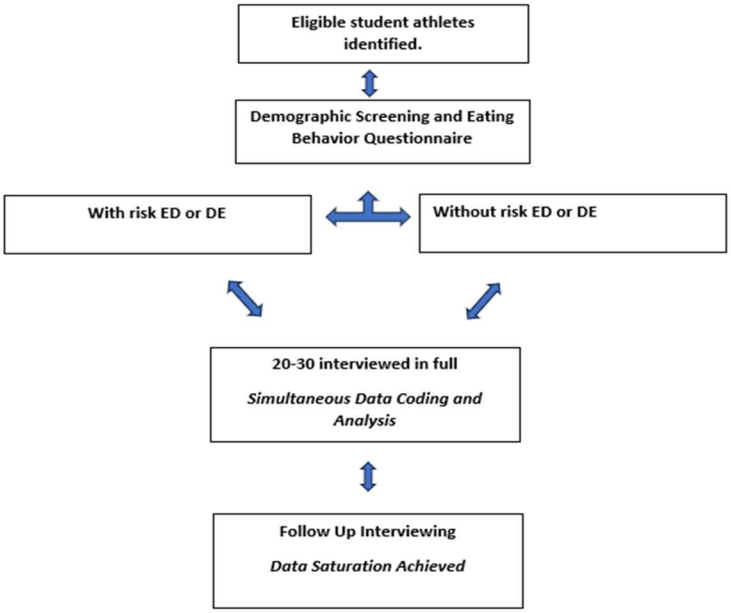
Procedures

Institutional Review board (IRB) approval was obtained before the collection of data, and all student athletes voluntarily agreed to take part by written informed consent (See Appendix A for consent) (Creswell, 2007). Student athletes were recruited via email in the corresponding sports (basketball, tennis, soccer, lacrosse), inviting them to learn more about their food choices and eating behaviors. (See Appendix B for email) (Wall et al., 2010). Those taking part in the study were directly contacted by the lead researcher and asked to complete a brief screening questionnaire to decide eligibility and show student athletes with possible ED or DE behaviors. This instrument was used to find the sample of student athletes who will contribute to the theoretical modeling of food choice, as it is common for researchers to intentionally select participants based on their ability to contribute to their study (Blair, 2007). For inclusion in the study, all student athletes were active athletes on an active roster before interviewing, and at least 18 years old. As part of the email-based screening process, the collected data included demographic information including age, gender, academic status, and sport. Once inclusion screening was completed, an appointment was made to schedule an individual face-to-face interview with the lead researcher, and prior to completing the interview, all student athletes consented to the study, with the choice to withdraw at any time. Ineligible student athletes who do not meet the preliminary inclusion criteria were not asked to take part in the study. The prevention of ED and DE behaviors is ideal, so all student athletes will be additionally educated on the dangers of ED and DE and the importance of recommended eating behavior. Furthermore, coaches were informed on the role of creating a supportive environment for athletes to make the

best sports recommended food choices, as it has been seen that coaches can lower the risk of eating disorder risk through proper counsel (Currie, 2010). All coaches were recommended to use the guidelines addressed by the ACSM which detail the nutritional and coaching practices to be used when athletes pose a risk for ED or DE behaviors (Currie, 2010).

Figure 6

Recruitment and Selection of Student Athletes for Primary Data Collection



The student athletes chosen for this study were made with intention about their gender (male or female), class(freshman/sophomore/junior/senior), and participating sport (basketball, tennis, soccer, lacrosse). Added exclusion criteria included student athletes who have previously graduated, those that are younger than 18 years old, and those not taking part in one of the required sports during the 2023-2024 academic year. Demographic information including the student athletes' age, academic class/status, gender, and sport was described in tabular form. After the inclusion and sampling process, student athletes taking part in the study were scheduled for individual interviewing, as this initial step is imperative to provide rich information on the determinants of food choice (Cairns-Lee et al., 2022). Semi-structured interviews were

performed to explore themes that emerge during data collection, and a combination of pilot interviewing and in-depth individual interviewing will be performed to intensify the understanding of the studied phenomena and elaborate on the determinants of food choice in DIII student athletes (Cairns-Lee et al., 2022). The entirety of the recruitment and selection process can be depicted in Figure 7.

Eating Behavior Screening

The early detection and recognition of ED and DE behavior can positively reduce the psychological and physical outcomes by improving the prognosis of the disease (Morgan et al., 1999). The existing questionnaires for early detection are extensive, and diagnosis may require medical professionals for interpretation (Dibartolo & Shaffer, 2002). In literature, there are a limited number of simple screening instruments available for non-specialists, however, a more recent screening instrument entitled the "SCOFF" questionnaire seems efficacious for detecting the prevalence of ED behavior (Morgan et al., 1999). The name SCOFF is an acronym for the closed ended questions used to assess ED, which is defined through the mnemonic: Sick, Control, One stone, Fat, Food (Morgan et al., 1999). In a sample of male adolescent athletes (n=351), the risk for ED was decided using a SCOFF questionnaire, and the risk for ED did not show a greater trend in the sample (Pustivšek et al., 2014). The results from the study showed similar results in the female athlete population, where a study (n=115 nonathletes; n= 94 athletes) using the SCOFF examined the eating behaviors, body satisfaction, and general psychological well-being in female nonathletes and athletes, and revealed less ED behaviors in athletes than the scores of nonathletes (Dibartolo & Shaffer, 2002). The SCOFF questionnaire appears effective as a screening instrument for the prevalence of ED and has been confirmed in

an athlete population adopted to identify the intimation of an ED (Pustivšek et al., 2014; Dibartolo & Shaffer, 2002).

For this study, a modified SCOFF questionnaire will be emailed to potential student athletes as an inclusionary demographic. The administration and scoring guidelines are simple and have validity and reliability in detecting the presence of an ED of any variety (Morgan et al., 1999). This study will use a modified SCOFF questionnaire which will have six self-administered questions. If student athletes answer "yes" to two or more questions, this reflects a positive score, and raises the index of ED behaviors, with a sensitivity of 100 percent and specificity 87.5 percent (Morgan et al., 1999). Sensitivity refers to the instrument's ability to find potential individuals who have the condition, while specificity is the ability to exclude those without the condition (Greenhalgh, 1997). As Greenhalgh (1997) explains, a test is valid if it reflects high sensitivity and can capture most people with the target disorder, while also reflecting high specificity and excluding most people without the disorder.

The eating behavior screening instrument will be emailed to potential student athletes for anonymity, and once the responses are received, the instrument will be scored. For every "yes" answer, there will be one point given, and for a "no", there will be zero points (Morgan et al., 1999). The terminal score of 2 points or more shows the possibility of an ED and will be used to identify those student athletes with possible ED behavior. It is important to note that the use of the eating behavior questionnaire is not to diagnose or treat an ED, so based on the score, the student athletes will be divided into two groups: with and without the increased risk for ED, and this variable will be used for analysis in the study. The screening questionnaire (Appendix C) is simple and practical for suggesting likely ED and DE behaviors rather than to diagnose, as these

behaviors have been proven to be problematic in both male and female athletes (Pustivšek et al., 2019).

Semi Structured Interview Guide

The semi-structured interview was developed based on the Athlete Food Choice Questionnaire (AFCQ), which was the first survey tool used by researchers in seeking the multifactorial influences of food choice in athletes (Thurecht & Pelly, 2021). The AFCQ is a validated tool that includes 32 questions (See Appendix D), which align with previously cited literature referencing nine dimensions of food choice including performance, sensory appeal, weight control, food values and beliefs, influence of others, usual eating practices, emotional influences, food and health awareness, and nutritional attributes of the food (Thurecht & Pelly, 2021). In literature, the AFCQ has undergone multiple validations during its development in international athletes and has proven to show admissible factor analysis and acceptable reliability, face, and construct validity (Thurecht & Pelly, 2019). While the AFCQ is generally recognized as a tool for food choice determinations, the AFCQ lacks the specificity and nuance in a specific cohort of athletes, specifically those in different athletic environments (Thurecht & Pelly, 2019). As Thurecht & Pelly (2019) explain, while the AFCQ is proficient in gaining access to food choice determinants in a wide range of diverse sporting backgrounds, it would be beneficial to translate and confirm the survey in different environments and through different methods to better support its practical use. To further the knowledge and complexities of food choice in athletes, and the overall validity of the AFCQ, the DIII student athletes in this study will take part in semi structured interviews based on the nine-factor model of the AFCQ. and the previously described dimensions of food choice (Thurecht & Pelly, 2019).

Semi-Structured Interview

The semi-structured interview guide will try to gather the determinants of food choice in the DIII college environment and the perceived barriers and drivers of an athlete's eating behaviors. This researcher designed the interview guide to specifically assess the food choice and eating behaviors of DIII student athletes, and explicit procedures will show the content validity of the interview questioning. First, the interview guide will be reviewed and critiqued by two highly distinguished content experts, including one qualitative research methodologist and one nationally recognized registered dietitian. Following correction and suggestions in verbiage of interview questions, the semi structured interview guide will be piloted with a group of non-participating student athletes from the university (n=5-10). Non-participating student athletes are those who are actively in a transition period from sport because of injury or rehab, or those athletes with a complete cessation of competitive sport (Knowles et al., 2021). The subsequent suggestions and feedback related to phraseology of specific questions will be synthesized during the finalized draft. None of the piloted participants will be included as subjects in this study, and the finalized interview will consist of twenty-seven total questions distributed over nine sections, which represent the final nine validated AFCQ food choice factors (Thurecht & Pelly, 2019). Interview questions were developed in conjunction with the validated nine factors within the AFCQ, and de novo after the extensive literature review identifying gaps related to food choice and student athlete eating behavior (Thurecht & Pelly, 2019; Symmank et al., 2017). While interview questions are semantically based on the AFCQ, each question is novel in relation to food choice and are presented in the following order: nutritional attributes of the food, emotional influences, food and health awareness, influence of others, usual eating practices, weight control, food values and beliefs, sensory appeal, and performance (Thurecht & Pelly, 2019). These

questions were also based on the conceptual model guiding this research (Bisogni et al., 2002; Furst et al., 1996), and the researcher's knowledge and plan for eliciting the most prudent responses to answer the study's research questions (Strauss & Corbin, 1998). The finalized version of the semi-structured interview guide (See Appendix E), as Hatch (2023) explains, includes the use of twenty predetermined, open-ended questions to provide more consistency in the relevant data extraction for informing theory. There are also two probing questions that will be asked with the original open-ended question to provide more details needed to understand the original question (Kallio et al., 2016). Probing can be defined as verbally summarizing the main question or idea with questions encouraging participants to speak further on the topic (Kallio et al., 2016). Interviewing will persist throughout the study until no added information emerges and data saturation occurs (Crewell, 2007).

The Researcher's Role

This study has employed a constructivist grounded theory philosophical methodology, which astutely puts the relativist ontological position of this researcher, and the student athletes studied as the co-creators of the determinants of food choice (Foley et al., 2021). This results in a theory grounded in the experiences of the researcher and subject and requires awareness of the underlying personal biases and assumptions during the study, which is called reflexivity (Foley et al., 2021). The qualitative researcher cannot conduct meaningful inquiries without being reflexive, or showing the preconceived notions about the phenomenon that may negatively affect what is seen, heard, and reported (Foley et al., 2021). As an undergraduate professor of physiology and the lead research for this study, it will be important to bracket my position within the study, and communicate nuanced decisions made when generating theory based on the student athletes' experiences and social practices of food choice (Finlay, 2002). In this study, no

student athlete will have a direct relationship with the researcher that may present a conflict of interest, such as a contractual relationship, a reporting relationship, or any other bias implicated relationship that may affect the research (Finlay, 2002). In addition to helping the general data collection through semi structured interviewing, this researcher plans on delving beyond the literal meanings of descriptive data and actively forming the co-construction of food choice theory with student athletes (Charmaz et al., 2018).

Data Collection

This section will describe the data collection process for this study conducted in three phases: pilot testing, eating behavior screening, individual semi-structured interviews, and follow-up interviews. For demographic screening and eating behavior assessment, student athletes will be emailed the modified eating behavior screening instrument (Morgan et al., 1999). For primary data collection, initial pilot testing of the semi structured interview will be conducted on (n=5-10) non-participating student athletes, who will expressly be excluded from primary data collection. After pilot testing, the semi structured interview guide will be modified to capture the necessary saturation of data, and the finalized interview will be used for primary data collection (Creswell, 2007). In broad terms, saturation can be defined as the point in qualitative inquiry where data is sufficiently gained and is used as a criterion for discontinuing data collection (Birks & Mills, 2022). After analyzing and coding the data transcripts, and the theoretical modeling has been developed, data saturation will ensure that student athletes responses were adequately represented, and data input was correctly interpreted (Corbin & Strauss, 2008). These procedures were used to establish content validity within the research study (Creswell, 2007).

Pilot Testing – Face Validity

Unlike quantitative studies, where objectivity reigns in a single reality, qualitative studies employ an approach to investigate an individual's subjective experiences, opinions and beliefs, and the primary method of data collection is through interviewing (Percy et al., 2015). The two fundamental elements in qualitative studies are the interview, which is the primary instrument in data generation, and the interview questions, which allow the descriptives of the phenomenon from the person's account (Paisley & Reeves, 2001; Merriam, 2016). To increase validity and credibility, piloting the semi structured interview will be critical to test the power of the questions used, and gain insight into the practice of interviewing for this study (Jacob & Ferguson, 2012). Participants for pilot testing will be (n=5-10) non-participating student athletes and a formal invitation will be sent through the university's web-based email services inviting participants to pilot the semi structured interview. Those used for the pilot study will be selected on a convenience sampling procedure and willingness to participate, and there will be an effort made to interview at least two male and two female professionals (Jacob & Ferguson, 2012). A letter of informed consent will be given to each participant, and after IRB approval, the interviews will be conducted in an available classroom in the university's athletic building. The interviews will be audio recorded, with the desired duration ranging between 20 and 25 minutes. The aim of the pilot testing is to ensure the appropriateness of the semi structured interview questions and build the emergent theoretical formulation of food choice in DIII student athletes (Hennink et al., 2011). There will be nine open ended interview questions for piloting, which will be commensurate with the actual interview questions used to formulate this study's theory. Probing questions will be used when clarifying unknown information or jargon and to gain additional information in answering the original interview questions. Pilot testing, or face

validity, will also assist in gaining experience in conducting in-depth, semi structured interviews, most specifically, the skills needed with the flow of conversation and building rapport with subjects (Hennink et al., 2011).

Interviews

After conducting the initial pilot testing and analyzing the corresponding feedback, the lead researcher will use a semi structured interview guide to conduct one-on-one, semi structured interviews (Draper & Swift, 2011). After IRB approval and distribution of informed consent, each individual interview will be conducted one-on-one, in a quiet room, and in the university's athletic building. The lead researcher will read and sign the informed consent, and review the procedural details of the interview with the student athletes. The student athletes will be provided with pen and paper for reflection and note taking, and to preserve anonymity, pseudonyms will be used as designations in data analysis (Corbin & Strauss, 2008). The interview contains nine open ended questions guided by the AFCQ and feedback from the initial pilot testing, and probing questions to allow student athletes to further elaborate their subjective experiences with determining food choices (Corbin & Strauss, 2008). The lead researcher will conduct the interviews, and all interviews will be recorded via Zoom (San Jose, CA), lasting approximately 30 to 45s minutes, and recorded without video. The video will not be recorded, as the audio is the only necessary data needed for transcription purposes. The semi structured interview guide will be adherently followed by the lead researcher to ensure consistent and credible data collection, and the athlete's own recorded descriptions from audio transcript will be used to ground the student athlete's interaction with the interview process (Creswell & Poth, 2016). As Corbin & Strauss (2008) report, the data produced from interviews are words, which can be taken through recording or audio and transcribed to produce viable transcripts for theoretical

analysis. The general format and purpose of interviewing helps identify the processes and patterns in data, and aid in building concepts and theory from the corresponding data (Corbin & Strauss, 2008). Once the interviews are completed, the transcripts of responses and discussion during the interview will be sent to the student athletes for review, with the intent of asking if there were any additional insights upon reflection (Draper & Swift, 2011). After validation from the student athletes, necessary edits will be made to the transcribed data, and interviewing will continue until theoretical saturation is reached, and no added information emerges from the data (Creswell, 2007). Transcription will be conducted through NVivo transcription, which allows for the transcription of interviews word for word. There is no standard enumeration on saturation and the quantification of interview sessions, however, this study will seek to gain as much data necessary until interviewing becomes redundant (Creswell, 2007).

Data Analysis

In congruence with this study's qualitative grounded theory approach, the collection and analysis of data will emerge through a constant comparative research process (Corbin & Strauss, 2008). This process allows researchers to analyze and compare new data to existing data, and as a result, the textual data gathered from the semi structured interviews will be used for the development of the theory guiding this study (Strauss & Corbin, 1998). Through constant comparison, the student athlete's words will be labeled and properly described in relation to their determinations with the food choice process, and this study will use open, axial, and selective coding to break down the data into manageable portions (Strauss & Corbin, 1998). The first phase of coding is known as open coding, where each line of the transcribed interview is coded by line, by using a few words to describe the data (Urquhart, 2013). In this phase of coding, the student athletes' words are broken down into discrete principles and labeled with an attributable

name, including “in vivo codes” taken from the student athlete’s responses (Urquhart, 2013). The lead researcher will conduct and transcribe each interview, and carefully review the text line by line to develop codes, build categories, and insert theoretical assumptions (Urquhart, 2013). To ensure inter-coder reliability, there will be one additional qualitative coder with extensive background in qualitative methodology assisting in verifying the research coding (Foley & Timonen, 2015). Multiple coders on a research team often code the same data to enrich the analysis of data collection that eventually converges on a combined interpretation (Foley & Timonen, 2015). Each of the transcripts will be cross-analyzed and reviewed by each member of the coding team, and to further reliability, the transcripts will be sent to an external auditor (Foley & Timonen, 2015). As open coding continues, and data becomes sorted, axial coding will be used to group codes into larger categories (Birks et al., 2011). From axial coding, the interconnectedness among food choice categories can be formed by relating concepts to each other, and the number of categories is supported by an informed set of supporting codes (Birks et al., 2011). The categories formed by axial coding are situated around the ‘axes’ which support the corresponding codes, and terminally, selective coding is the process of integrating and refining theory (Strauss & Corbin, 1998). Selective coding will be the last process of connecting all categories together into a central core category, where the unification of theory will be built around the original research questions (Corbin & Strauss, 2008). The development of the core categories from selective coding will be based on the axial coding process of analysis and represent the central theme of the research (Birks et al., 2011). The culmination of this research study and the constructivist grounded theory process will be intended to explicate a new theoretical model of food choice, or modify an existing theory (Charmaz, 2006). In constructivist grounded theory, coding is an imperative function in focusing the interview analysis on the

experience of the student athletes in a structured way (Charmaz, 2006). Coding is also a critical part of data analysis because of the reflexivity in preventing interviewer bias and creating a thorough analysis of the entire semi structured interview (Charmaz, 2006). This study will use Computer Assisted Qualitative Data Analysis (CAQDAS) software to facilitate data analysis and management, specifically NVivo 14 (QSR International, Doncaster, Vic., Australia) (Bryant & Charmaz, 2007. This software will be used to ensure sufficient management and labeling of pieces of data assigned to a specific code, and for a repository for keywords used for comparison with manually coded themes and categories (Bryant & Charmaz, 2007). All transcribed interview data will be converted into the necessary formatting for import into NVivo 10 for analysis to help evaluate and develop theory (Bryant & Charmaz, 2007).

Trustworthiness

This research study and the conducted semi structured interviews will aim to reach a final grounded theory of food choice in DIII student athletes from an empirical grounding, where the requisite theory and its concepts are clearly demonstrated within the data and through credibility and trustworthiness (Strauss & Corbin, 1998). Trustworthiness is like internal validity in quantitative research, and is defined as a study's ability to establish credibility, dependability, confirmability, and transferability (Lincoln & Guba, 1985). To ensure the trustworthiness of this study, the lead researchers dissertation committee members will be recruited to provide feedback on the study and the techniques used in data collection and analysis (Lincoln & Guba, 1985). These members will include two faculty members well versed in nutrition research, and feedback will be used to support and confirm content validity (Lincoln & Guba, 1985). The lead researcher will meet several times with these team members who have expertise in qualitative

methodology to guide the study's design, discuss the coding processes, and accurately report the findings (Corbin & Strauss, 2008).

Credibility

In qualitative research, the credibility of a study hinges on the plausibility of findings from the resulting data (Corbin & Strauss, 2008). For this study, credibility will be established using two verification procedures described for data collection including triangulation and member checking (Corbin & Strauss, 2008). Triangulation is defined as the application of multiple data collection methods (Patton, 2002), and member checking is a process of confirming the interpretation of data among participants (Crabtree & Miller, 1999). This study will emphasize credibility through triangulation by using two forms of data collection: pilot interviews and individual semi structured interviews (Corbin & Strauss, 2008). This combination of data collection helps the study to overcome the intrinsic biases often associated with using a singular approach of data collection (Corbin & Strauss, 2008). Member checking will also enhance this study's credibility, as the conducted study will share its findings with student athletes who participate (Corbin & Strauss, 2008). An emailed summary of the individual interviews and the transcribed data will be sent within three weeks following the interview, with the intention to conclude that the research findings are commensurate with individual accounts of semi structured interviewing (Corbin & Strauss, 2008).

Dependability and Confirmability

This research study will seek dependability by accurately describing the studies overall procedures with prudent detail (Maher et al., 2018). Dependability is defined as the ability to repeat the studies work and requires a detailed description and audit of all research methods (Maher et al., 2018). In the current study, a constructivist grounded theory methodology offers a

dependable descriptive approach in data collection and analysis, which can be replicated in developing theory (Charmaz, 2006). In addition, confirmability is defined as the minimization of bias by recognizing the researcher's predispositions in the study (Lincoln & Guba, 1985). To reduce researcher bias, the transcription of interviews will be coded systematically using NVivo 10 to help ensure the validity of interview content, and memo writing will occur regularly throughout the semi structured interview process (Lincoln & Guba, 1985). Memo writing is a technique in qualitative research that helps to minimize bias by separating the thoughts of the researcher that might be imparted on the studies theory (Birks et al., 2011).

Transferability

By purposively sampling with DIII student athletes and thoroughly describing their characteristics with rich contextual descriptions, the transferability of this study will demonstrate the rigor in this research (Charmaz, 2006). Transferability in qualitative studies relates to the transference of a studies protocols specific to a particular context or environment (Charmaz, 2006). For more robust transferability, this study provided thick descriptions of the research contexts to allow the reader to estimate whether the study can be reproduced to their particular situation (Charmaz, 2006). While the transferability may seem limited in this research because of the specific population, this study is transferable to a myriad of different cohorts and subjects (Charmaz, 2006).

Ethical Considerations

In the present study, ethical considerations will be exhaustive in nature, with the overall study protocol being approved by institutional review board (IRB). Informed consent for student athletes will follow U.S. federal guidelines including the explanation of procedures, descriptions of risks, descriptions of expected benefits, questions about the procedures, and the ability to

withdraw at any time (Frankfort-Nachmias & Nachmias, 2008). Ethical considerations relating to the protection of student athletes will also be critical when reporting and disseminating the research's descriptive data and theory (Chiovitti & Piran, 2003). This study will be uncompromising in securing the names and identities of the student athletes who participate, and pseudonyms will be provided during dissemination of results to protect anonymity (Chiovitti & Piran, 2003). The potential risks to human subjects, specifically student athletes, will be minimized as all participants will be required to be over 18 years of age, and with no documented impaired mental capacity or ED or DE behavior (Chiovitti & Piran, 2003). This predetermined criterion will ethically qualify them as active subjects in this study, and additionally, the transcribed notes and recorded interviews will be erased after 3 years following final approval by the dissertation committee (Corbin & Strauss, 2008).

Summary

The purpose of this chapter was to outline the qualitative research method used in answering the study's research questions and building upon a theoretical model surrounding the determinants of food choice in DIII student athletes. A discussion of the study's methodology, study population/participants, data collection and analysis, and ethical considerations outlined the structural basis for how the study will be conducted and the potential for replication. This study chose to use a constructivist grounded theory approach to build on the determinants of food choice in DIII student athletes, with the intention of formulating a new food choice model to fill in the gaps in literature. All student athletes who participate in this study will be instrumental in building on the current theory of food choice by sharing their experience in the DIII collegiate environment and their associated determinants of food choice.

CHAPTER FOUR: FINDINGS

Overview

This chapter will describe the findings from primary data collection which helped build the theoretical framework for answering the research question and sub question, "What are the determinants of food choice in NCAA Division III student athletes?", and "What factors influence the ability of athletes to make food choices in congruence with sports nutrition guidelines?". This chapter will also include a description of the sample demographics, as well as the procedures followed to analyze data from the individual interviews. Additionally, the chapter will include details of code and theme data, and sample quotes from student athlete interviews used to prove the emergent themes and the resultant framework.

Results

Sample Demographics

In this qualitative study, the estimated point of saturation was seen after 20 interviews; however, one additional interview was conducted to be sure true saturation was achieved. A total of 21 interviews were conducted and all participants were DIII student athletes between the ages of 18 and 21, with 48% (n=10) being male and 52% (n=11) female, and with a mean age of 19.3 ± 0.8 (range = 18-21 yrs.). Student athletes in the sample were purposefully selected and took part in either lacrosse (n=6), basketball (n=5), soccer (n=6), or tennis (n=4). In terms of academic year, most of athletes (33%) were sophomores, followed by first-year students (24%), seniors (24%), and lastly juniors (19%). Table 1 and Table 2 depict the student athlete demographic characteristics, as well as the assigned identification and eating behavior scores for each participant.

Table 1

Demographic Traits	Frequency (%)
Gender	
Male	10 (48%)
Female	11 (52%)
Age (years)	
18	3 (14%)
19	10 (48%)
20	6 (29%)
21	2 (9%)
DIII Sport	
Lacrosse	6 (28%)
Soccer	6 (28%)
Basketball	5 (25%)
Tennis	4 (19%)
Academic Year	
Freshman	5 (24%)
Sophomore	7 (33%)
Junior	4 (19%)
Senior	5 (24%)

Table 2

Student Athlete Demographics

Participant ID	Age	Sport	Academic Standing (2023-2024)	Gender	Eating Behavior Score
SA05	20	Tennis	Senior	Male	0/6
SA06	19	Tennis	Sophomore	Male	0/6
SA07	19	Basketball	Freshman	Male	0/6
SA12	19	Soccer	Sophomore	Male	0/6
SA14	19	Soccer	Junior	Male	0/6
SA15	19	Basketball	Junior	Female	0/6
SA16	21	Lacrosse	Senior	Male	0/6
SA17	20	Basketball	Sophomore	Male	0/6

SA20	19	Soccer	Junior	Female	0/6
SA21	19	Soccer	Sophomore	Male	0/6
SA02	19	Basketball	Freshman	Female	1/6
SA19	20	Lacrosse	Junior	Female	1/6
SA01	19	Lacrosse	Sophomore	Male	2/6*
SA03	21	Lacrosse	Senior	Female	2/6*
SA08	20	Lacrosse	Sophomore	Female	2/6*
SA09	20	Tennis	Senior	Female	2/6*
SA10	18	Soccer	Freshman	Female	2/6*
SA11	19	Basketball	Sophomore	Female	2/6*
SA04	18	Lacrosse	Freshman	Male	3/6**
SA13	18	Tennis	Freshman	Female	3/6**
SA18	20	Soccer	Senior	Female	4/6**

Notes: *Scores with <2 connotes positive Disorder Eating Behavior and elevated risk for eating disorder
**Scores with <3 connotes Disorder Eating Behavior and high risk for eating disorder

Eating Behavior Screening

As part of the screening process, student athletes were screened for indications of DE behaviors and risk for clinical ED. The instrument included a 6-item Eating Behavior Questionnaire to detect the risks among student athletes, and the questionnaire was dichotomously coded (yes or no) with scores ranging from 0 to 6. If student athletes' scores were greater than 2, it was considered a positive indication of DE behavior and potential ED. In validating the efficacy of this questionnaire, earlier studies have shown a strong specificity of 89.6% and a sensitivity of 84.6% (Hill et al., 2010).

Of the 21 completed questionnaires, 43% (n=9) had potential eating disorder behaviors (yes to 2 or more of the 6 questions), as found by the scoring metrics. The results show that 14% (3 out of 21) student athletes scored a 3 or higher, indicating the athlete is at risk for potential DE

behavior. Additionally, 29% (6 out of 21) that scored from 2 or higher, indicating they exhibit DE behaviors and are at an elevated risk of an ED. The rest of the student athletes, 57% (12 out of 21) scored between 0-1, indicating they are not at risk of an ED.

The overall breakdown of eating behaviors scores is represented in Figure 2. Figure 3 shows the ranges of "Yes" scores for female student athletes, with 45% (5 out of 11) that scored 2 or higher, and 18% (2 out of 11) scoring 3 to 4. The remaining female athletes, 36% (4 out of 11), scored 0 to 1. Figure 4 illustrates the male "Yes" scores, with 20% (2 out of 10) that scored 2 or more "Yes" scores, and the remaining male athletes scored 0 out of 6, 80% (8 out of 10). Female student athletes showed a higher frequency of risk for DE and ED than male athletes, which is consistent with current literature showing sex as a predominant risk factor.

Figure 7

Eating Behavior Scores for DIII Student Athletes

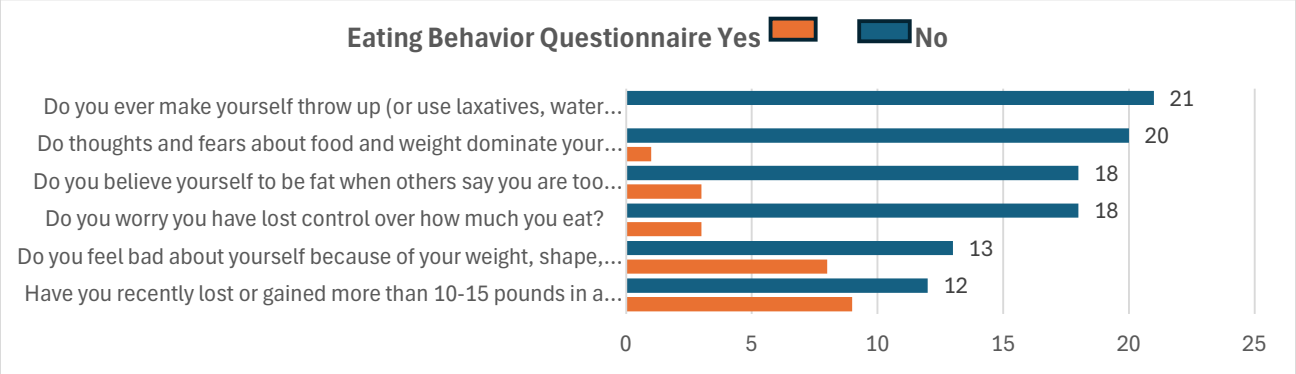


Figure 8

Female Eating Behavior for DIII Student Athletes

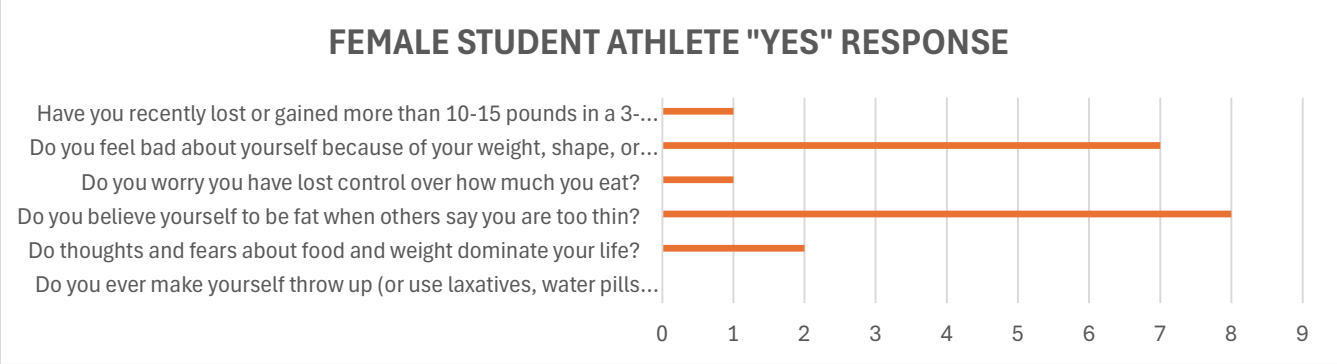
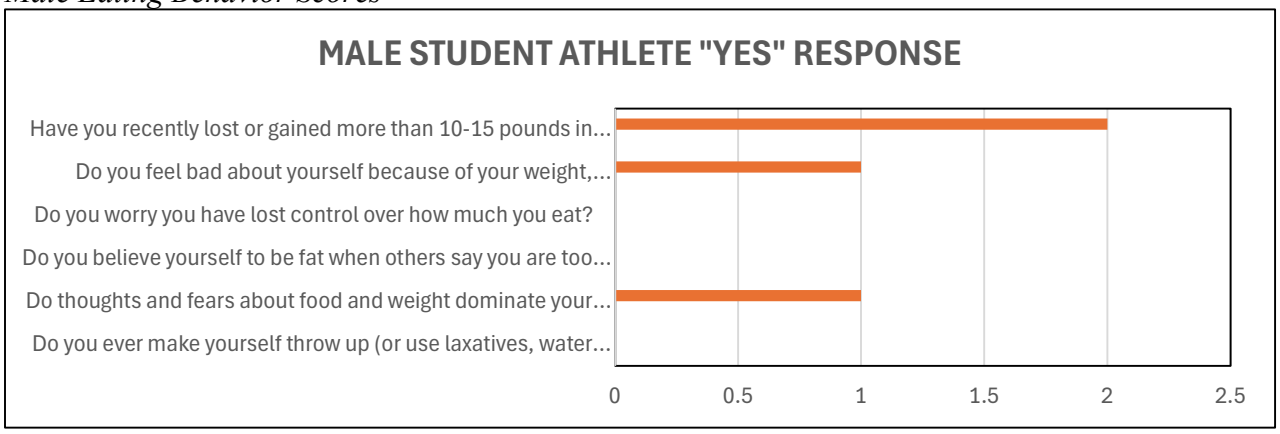


Figure 9

Male Eating Behavior Scores



Interview Results

Based on the study's inductive approach, a theoretical framework of factors determining food choice in DIII student athletes was developed based on the constant comparative analysis and coding of primary interviewing. The framework consists of four dominant themes surrounding food choices, including individual factors (intrapersonal), athletic factors, social factors (interpersonal), and contextual factors (environmental). The themes assimilated from the data were based on the questions asked during the interview and centered around the main research question and sub question (see Table 3 for interview questions). Additionally, a framework of barriers and enablers of student athlete food choice was also seen through interview questioning. All themes surrounding food choice were analyzed conjointly with the FCP conceptual framework guiding this study. The significance of the FCP model in this research study illustrated the dynamic interactions between the student athletes' food choices and the integration of the life course, influences, and personal food systems when establishing eating behavior. Thematic analysis from interviews were coded iteratively and consummated in the thematic map in Figure 5, and the framework of barriers and enablers is illustrated in Figure 6.

Figure 10

Theoretical Model of Determinants of Food Choice in Division III Student Athlete

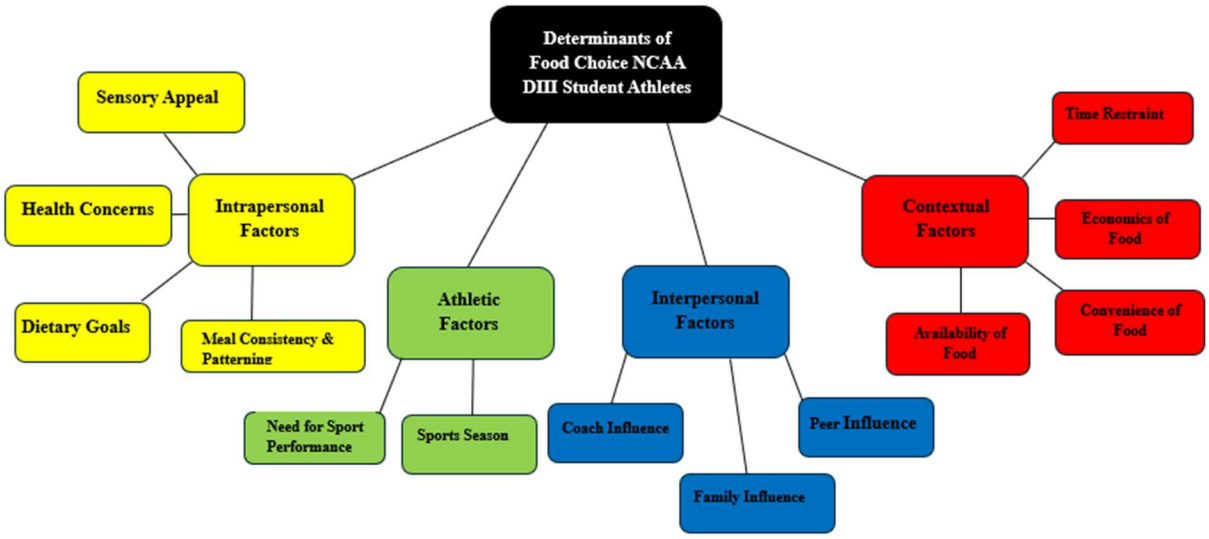


Figure 6

Theoretical Model of Factors Influencing the ability to make food choices in DIII Student Athletes

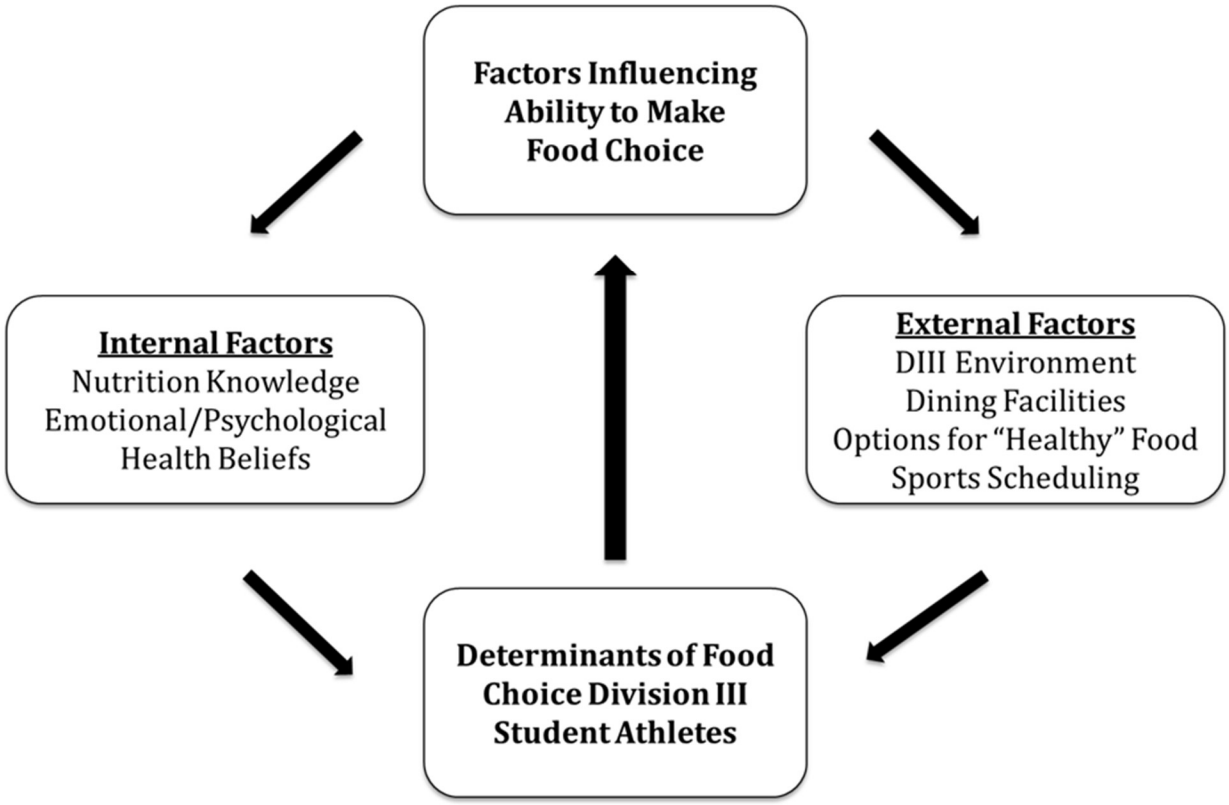


Table 3

Student Athlete Interview Question Guide

1. What are the most important foods for you and why?
2. In what ways do you think your food choice affects your health?"
3. Explain why an athlete's food choice would be different from a regular student's. Is there a major difference, and if so, why?
4. Please describe your food and eating behaviors on a regular day?
5. Describe your food and eating behaviors on an irregular day, weekends, off days, sick days, etc.
6. Please explain how your everyday life affects how you choose your food.
7. Please discuss the current availability of healthy food choices in your immediate living area
8. If you could make one change to the food availability on campus, what would it be and why?
9. Please explain what impact your family has on your food choice and eating behavior?
10. What were the biggest reasons why your family chose the food they ate?
11. When it comes to regular food choices, have you changed your eating behaviors due to the environment i.e. the collegiate sports environment and why?
12. Where do you buy most of your food and why?
13. Where do you eat most of your food and why?
14. What foods do you choose that help achieve your health (or fitness) goals and why?
15. How do you ensure that your food choices align with your personal beliefs and explain how you're eating behavior reflects your personal beliefs.
16. Please describe the traits/characteristics of the foods you frequently choose, for instance, crunchy, salty, sugary, and how often do you choose these foods and why?
17. Why do you think you prefer to choose certain foods over others?
18. Please explain the variation in food choice during a sports season and why is your food choice different between seasons?
19. Please explain the impact on your food choices from either your coaches or teammates.
20. Why do you choose certain foods for sports related activities or training?

Theme One: Individual (Intrapersonal) Factors of Food Choice

Individual, or intrapersonal factors of food choice were found to be a significant theme across the study, as student athletes' food choice and eating behaviors were dependent on satisfying their intrapersonal needs. In this study, these factors of food choice can be explained as a reciprocal interaction across four ancillary levels of intrapersonal factors including their sensory appeal or taste, health concerns, their dietary goals, and the need for meal consistency and patterning. The individual determinants of food choice were overly complex and relative to each student athlete, and heavily influenced by one of the four specific intrapersonal factors.

Sensory Appeal

Student athletes' sensory appeal and taste for food were strong intrapersonal factors in determining food choice. When student athletes were asked, "Why do you think you prefer to

choose certain foods over others?", some student athletes responded by saying:

> "Taste is more important than anything else." (SA04).
>
> "Well, I like carrots and ranch, the flavor and taste are so good, so I pretty much choose tasty things." (SA20).
>
> "I think I almost always choose whatever my taste buds tell me to eat!" (SA21).

Familiarity and likeability also played a role in the sensory appeal of choosing food, as other student athletes confirmed:

> "I like just about anything, I'm not that picky of an eater, I would say my favorite food is probably mac and cheese because it tastes awesome." (SA17).
>
> "I have my favorites like spaghetti and anything with pasta, but I don't eat that all the time." (SA02).

While student athletes highlighted the importance of taste as a determinant of food choice, several athletes also identified the need for health when making food choices by stating:

> "I base most of my food choices on a few things, like the taste and the health aspects of it, but in terms of importance, I would say anything with protein is the most important, followed by mostly any vegetable." (SA19).
>
> "I'll pack a 4 oz bag of almonds as a snack between my first and second class, and then I'll come back to my apartment and have lunch, a salad with mixed vegetables, most likely tomatoes, carrots, and always cheese, I absolutely love my healthy salads." (SA03).

As responses from interviewing suggest, if food did not satisfy the taste or sensory appeal of the student athlete, it was unlikely to be eaten.

Health Concerns

Student athletes also spoke about their own health concerns and how it affects their food choice and eating behaviors. When student athletes were asked, “In what ways do you think your food choices affect your health”, one student athlete explained:

> “I don’t want to be 21 years old, graduate college, and have type 2 diabetes because of my diet.” (SA03).

Another student athlete echoed the same sentiment by responding:

> “I really had a wake-up call when I just kept gaining weight, and I went to the doctor, and they said I was in danger of being diabetic.” (SA06).

While some student athletes chose foods specifically for alleviating health concerns, others chose foods to support their health, as some student athletes were cited:

> “I feel like my food choice affects my health, because if I eat a lot of carbs, I’d gain weight, so I stick to the vegetables and salads, I do a lot of plant-based eating” (SA09).
>
> “Oh, I just don't like to feel bad because of what I'm eating. It's not worth it to me. Even if it sounds great and looks really good. I'm like, well, I'm going to feel horrible after eating it, then that's probably not the best thing to do.” (SA18).

Additionally, some student athletes discussed the impact of their current health condition on the ability to determine food, as those with conditions, such as lactose intolerance, explained the need to choose foods without diary or lactate:

> “So, I’m actually lactose intolerant, and I have been allergic since I was little, so I couldn’t have any diary because I would break out in hives and have to go to the hospital. But now if I eat an excess amount, my stomach is upset so the only thing I can’t do is milk. So, I stick to soy milk and almond milk, which still has protein.” (SA07).

Likewise, in response to the question, “What are the most important foods for you and why?”, one athlete explained:

> “Well, I love vegetables. I like fruit just for breakfast in the morning because it's light. I have a gluten intolerance, so pasta is not good for me like it is for other people.” (SA18).

It was clear that student athletes with health concerns avoided those foods to minimize any negative health implications.

Dietary Goals

Student athletes commonly report their dietary goals, especially those concerned with body composition, as an important factor of food choice. When asked, “Explain how your everyday life affects your food choice”, one student athlete exclaimed:

> “Well, I think just being a college student is a struggle, because I gained my freshman 15 in my freshman year, and I didn’t even really realize I gained weight until the start of the season.” (SA08).

Similarly, another student athlete recounts:

> “After gaining a few pounds, I quickly realized that I needed to change what I was doing, and for about a year and a half now, I’ve been consistent with my eating and diet.” (SA13).

Student athletes also provided insights into their regular eating behaviors surrounding their dietary goals, as they were asked, “What foods do you choose to achieve your health or fitness goals and why?”, and some athletes replied:

> “Well just vegetables and plant-based stuff helps me achieve my goals. They help me stay slim and trim, which helps me to be agile and move the way I need to” (SA09).

> "Honestly, I have a hard time with choosing the right foods during the day, which has led to me gaining unwanted pounds during the season, so I'm really just trying to stick to a healthier diet. Right now, I am limiting my meat intake and increasing my green consumption in salads and different vegetables." (SA03).

Additionally, another student athlete describes their efforts for a particular body composition:

> "My favorite foods are meats, but I don't think of that as a food that is directly tied to my goals. I don't want to be a body builder, but I do want to be toned like before I came to college." (SA13).

Many student athletes would choose foods believed to improve their dietary goals, by refraining from consuming foods that might negatively impact their dietary goals, by statements such as,

> "My goal is to be a better athlete, so with that, I'm always going to make sure that protein is the priority. If I've met my protein for the day, then I'll have other foods." (SA10).
>
> "I choose foods that will help me keep my calories under control so I can make my weight loss goals." (SA04).
>
> "I typically choose foods lower in sugar and high glycemic carbs and focus on protein mostly. I know that protein is the building block of muscle, and it helps me maintain my body composition." (SA14).

Student athletes also articulated constant negotiations between consuming enough food and calories for their dietary goals and ensuring intake supported those goals, by saying:

> "Throughout my time in school, my weight has fluctuated the entire time, and that is largely because of how I ate. So, I would say yes, the way you eat directly affects your health, but I think we all have a problem with staying consistent with healthy stuff." (SA16).

> “I see the benefit in eating correctly, and I think it really affects how I play and train. If I don’t eat enough, or I don’t get enough protein in my diet, I can feel a big difference” (SA06).
>
> “I’d say I am more aware of the decreased amount of food I’m taking in. At home, I always knew we would have food prepared, and now, I must find my food, which can be a challenge in terms of eating healthier.” (SA11).

Student athletes found that largely, their food choice and eating behaviors were directed toward their dietary goals.

Meal Consistency and Patterning

To support dietary goals and performance, some athletes were adamant in expressing the importance of meal consistency when figuring out food choice. Many of the student athletes commented on their planned attempts to keep a consistent meal schedule, because when asked, “Please describe your eating behaviors and food choices during a regular day?”, some athletes responded by saying:

> “More than anything I just think about being consistent with eating the same things, so it doesn’t matter too much what food it is. I’m not too picky of an eater, but I do like a routine, so I’m not frustrated with eating the same things that are in me and my roommates’ budget that we like to eat.” (SA16).
>
> “So, because I want most of my meals to be as easy as possible and don’t want to cook for hours and hours, I eat oatmeal on a consistent basis, then I'll get something from the dining hall at lunch, and I probably don’t eat again until after practice.” (SA08).

Student athletes were specific in choosing the number of meals in a day, with the goal of keeping a consistent schedule so that food choice was regular and patterned. As one student athlete commented:

> "I know that I get three meals a day because I prioritize my eating, especially during the season, and I've been able to get that consistently for about a year now." (SA02).

And similarly, this student athlete was also specific in the number of meals per day when saying,

> "Um, I would probably have a shortened meal schedule, so I like two meals. On a sick day, it would probably be waking up, eating something small, eating dinner later, and focusing on small regular meals." (SA04).

There were also student athletes who kept a regular pattern of eating by meal prepping in advance and keeping food choices consistent, as several student athletes explained,

> "I'm only going to eat what's in my meal prep and not worry about anything outside of those things I've already set into place." (SA13).
>
> "I try to remain consistent with my eating habits, but my schedule would probably be the one factor that could swing my consistency. I meal prep often, so I try and have a plan based on my schedule." (SA14).

Meal consistency and patterning seemed to alleviate the elaborate process of food choice, while also streamlining eating behaviors conducive to the DIII collegiate sports environment.

Theme Two: Athletic (Sports Specific) Factors of Food Choice

The dietary need for sports performance and the seasonal variations throughout the sports season were also relevant to student athlete food choice. The sports derived need to fulfill athletic obligations through specific eating behaviors was a prevalent theme, and one constant throughout the study, was regardless of sport, age, or gender, most athletes considered their need

for athletic performance as a major determinant of food choice. Moreover, student athletes used their food choices for the enhancement of performance, with varying impact on seasonal competition.

Need for Sport Performance

Even though participating student athletes compete at the DIII level, and given nature of collegiate competition, they commonly indicated the need for sport performance as a critical determinant of food choice. When asked, "Why do you choose certain foods for sports related training", most responses surrounded this student athlete's proclamation:

> "So that I can be the best possible athlete that I can. I came to school to play on the collegiate level, and I know the importance of protein and carbs in relation to performance" (SA04).

Another student athlete was prophetic in harnessing their food choice and eating behavior for optimal performance when saying:

> "I am very aware of the need to ingest more food because of the need for energy, especially when playing sports and training as hard as athletes do. That said, I think athletes have a slightly higher need for better eating and food choices, just because we need energy and calories, whereas a regular student who does not exercise would not." (SA06).

While most student athletes mentioned eating behaviors and food choices based on performative effects, some athletes chose foods based on specific macronutrient manipulation, as a perceived attempt to enhance sports performance. Carbohydrates were predominantly manipulated for sport performance, as several student athletes echoed the same sentiments:

> "Probably what I prioritize is pastas. When I am playing, it helps a lot with carb loading." (SA01).
>
> "Like for me, I know I need to drink water regularly and at least have a carb meal before practice or matches so that I will perform better." (SA13).

Protein manipulation and intake was also prevalent, as higher preferences for protein were seen to meet specific performance goals. As some student athletes commented,

> "I know that protein is the most important thing for building muscle, so I try and stick to my chicken and tuna." (SA16).
>
> "Water and protein are the two specific things that I use for training. I don't really take any supplements, and I try and eat as much protein as I can during the day, really for recovery." (SA17)
>
> "There is no other macronutrient more important than protein, so for me, I stick to protein more than anything else." (SA08)

Another student athlete was more emphatic about their protein intake, when asked "What are the most important foods for you and why", the response was:

> "Well, I feel like the most important foods are protein, for the sheer fact that protein helps build muscle, and we need muscle to move up and down the field. And I regularly choose protein for that fact." (SA10).

For some student athletes, practicing food choice manipulation in terms of restricting intake for perceived leanness effects was viewed as necessary for sports performance. As two student athletes explained,

> "Right now, I am just focusing on clean eating, and not getting too much junk food or snacks." (SA12)

> "My main priority is to cut and stay lean, so my main foods are lean meats and no minimally processed foods, like chips or ice cream." (SA06)

Additionally, student athletes commented on the attempts to achieve aesthetic body composition goals for their performance by saying:

> "I have been very intentional this season with trying to gain more muscle and see some benefits with my play in season. I know I must eat more, but my goals are to be a little bit bigger." (SA06)
>
> "I've tried to eat more protein because I am trying to get a little bigger. I have a workout program that I'm doing in the offseason, so to make sure the muscle growth is there, trying to ensure I eat enough protein." (SA07)

Student athletes were also aware of their food choices because of the potential impediment to their sports performance. As two student athletes explained:

> "I would definitely say if I don't eat well, I can tell a difference in my athletic performance, as well as in class. Most of the time, I'm trying to think ahead of what to eat, so that I don't become overwhelmed." (SA15)
>
> "Most of the time, I have to snack on my protein bars or protein shakes, while the team is getting McDonalds after a game, so it's not that I mind, it is just sometimes hard to find options that fit for me." (SA20)

Student athletes also commented on recovery as an aspect of performance, as their selection of certain hydration strategies and post competition food choices highlighted their further need for sport performance:

> "Um, then before practice I will drink a Gatorade, which does have a bunch of calories

but is good for my hydration, and after practice, I'll have a pasta salad or another salad with egg in it for protein." (SA03).

"After a long and nasty workout, I love to drink a chocolate peanut butter protein shake. I feel like it's like the best for workout recovery." (SA13)

"We have two-hour long practices, so I am always drinking Gatorade and having my protein shake to recover." (SA05).

Given the unique competitive demands of DIII athletics, the need for sports performance was a major factor in determining food choice.

Sports Season

The need for sports performance which influences food choice was relevant to the sports season and competition, as we found student athletes' food choice was dependent on the collegiate sports season. When asked, "Please explain your variation of food choices during a sports season?", some athletes were quoted as saying:

"There is little difference between in and off season for me, but I will say that just traveling to matches and being with the team in season is more difficult to be strict on my eating." (SA06)

"For me it doesn't really change, just for the fact that I know my performance is important." (SA09)

"There is really little variation during the season. Because like I said, it's very important for me to have a routine, if I get too far off, then I start to choose things that my body doesn't need. So, my offseason is just as important as in season, so I'm very aware of that." (SA10).

Conversely, there were student athletes who tried to maintain eating behaviors during the competitive season, as one student athlete explained:

> "I've really been trying to eat more calories this season, but usually during the offseason, I'm probably not eating as much because I'm not very focused on sports or eating for sports." (SA11)

Some student athletes also reported their eating behaviors were more liberal in the off-season by saying:

> "Well, this offseason I want to gain some muscle, so my dad is helping me come up with a plan to increase my eating and giving me a training program to follow, so it will change this year." (SA12).
>
> "In the offseason I'm always trying to bulk up and gain some weight, but in season, I'm pretty much eating to maintain the muscle and body weight that I gained in the offseason." (SA02).

Like the manipulations seen in carbohydrate and protein intake, some athletes commented on the rigidity of their eating behaviors during the sports season when saying,

> "I am regimented during the season. Offseason I am more focused on more carbs, and more surplus of calories." (SA04).
>
> "In season, I'm strict with my diet, even if it is minimal, because I want to maximize myself during games. The offseason is more tailored to growth, so I try even harder to increase my calories. (SA19).

While some student athletes were hyper vigilant in food choice during the sports season, other athletes were seen to not focus on the healthiness of their food choices, as some cited:

> "Actually, I'm eating unhealthier during the basketball season because like usually, on the way to games, coach will stop at a fast-food restaurant and get food for everyone, then on the way back, he would get pizza, so obviously not the best foods." (SA07)
>
> "I've really been trying to eat more this season, but usually during the offseason, I'm probably not eating as much because I'm not very focused on sports or eating for sports." (SA11)

In fact, it was seen that some student athletes tended to have the worst food choices and eating behaviors while in season, as it was said that:

> "In season, I'm not going to lie, I eat more fast foods because there is less time to cook, and actually, plan out meals, and I'm so tired after practice, give me some food, I don't care what it is." (SA15)
>
> "Like, in season, I eat less, I'm always on the move, I'm busy with film, practice, so I'd say the type of food doesn't change, but the amount of food does. In season, rather than going to the cafe and grabbing three plates, I'll grab one." (SA01)

As this study suggests, the variations of food choice during the season ultimately impacted eating behavior, and the intentionality of those choices were directed at the needs for performance.

Theme Three: Interpersonal Factors of Food Choice

While student athletes spoke in depth about their inherent food choices and dispositions towards specific foods, they also described an interpersonal influence in adopting certain eating behaviors, which seemed to unconsciously explain their food choices. The three-tiered social network includes the recommendations from their coach, the eating influences of their teammates and peers, and the traditional eating behaviors from family.

Coaching Influence

Student athletes commented on the influence of coaches when determining food choice, as most DIII collegiate coaches are considered the most salient in terms of authority over the athletes. When asked, "Please explain the impact on your food choices from either your coaches or teammates?", some student athletes commented that coaches were highly influential when making food choices:

> "Well, our coaches always encourage us to eat healthy, and their biggest thing is to get our electrolytes and fluids in" (SA10)
>
> "Coach has just started to tell us stuff about nutrition and eating, because I think our team had an issue with sloppy practices and games." (SA11)
>
> "Um, my coaches are pretty influential when we stop for games, they say this is where we are eating, no matter what it is." (SA15)

Coaches were also seen to establish nutritional goals for student athletes, especially concerning body composition goals for the competitive season, as two student athletes explained, "

> "One thing our coach wanted in the offseason was for me to gain muscle, so we had protein shakes in the locker room, or he encouraged us to eat more protein" (SA07)
>
> "As I said, coach does make suggestions to eat the right number of calories, especially to me, since I've had a previous history of losing weight" (SA06)

Some coaches often provided more targeted food choice advice, for example, intaking more protein or hydrating properly before competitions, as several student athletes claim:

> "Our coach does give us helpful tips about protein and hydration, but nothing set in stone" (SA05)
>
> "Yes, coach tells us to eat the right things, and has recently started talking about

protein, but it's more of training focused" (SA19)

Conversely, coaches were also seen to be non-influential to student athletes and their food choices, as several athletes commented by saying:

> "Thats funny, my coaches are probably the unhealthiest people because they don't follow any diet whatsoever, but they will tell us to get enough food in during the day." (SA20)
>
> "Our coaches. They just eat whatever. Like one of our coaches, we know he's not eating good food and he's drinking a lot. So, he doesn't really eat well, and he wouldn't really say anything about what anybody's eating" (SA18)

Family Influence

The familial influence and food experience of student athletes were prominent determinants shaping food choice and eating behavior. For some of the athletes, the early experiences with family provided them with references points for their food choices, as student athletes explain:

> "I do try and maintain eating fruits and vegetables, something my mom taught me while I was young. When I was little, if you didn't finish your plate, you couldn't leave the table, so I learned from that." (SA07)
>
> "Well, my parents did a good job feeding me and getting me to be good enough to reach the college lacrosse level, so they were always preparing my meals and making sure I got enough healthy food." (SA08)
>
> "I feel like my mom has engrained in me that society judges looks and things like that, so from a young age, she really pushed the salads and more of the healthy vegetables" (SA09)

When asked, “Please explain what impact your family has on your food choice and eating behavior?”, some student athletes bespoke about the major influences of family and food choices by saying:

> “I came from a home where health was a big thing, and nutrition was a big thing, because my dad is in the military, and getting ready to retire, and my mom has been in the medical field, so they have driven my nutritional habits.” (SA10)
>
> “My family is a huge influence on my eating habits, as we had relatively lower income for most of my early childhood. This meant that food was very often processed, and until my father got a new job and we moved, our eating was poor. Now, I know the benefits of eating healthily, and my family has also benefitted from their change of eating as well.” (SA14)

For some athletes, family food traditions were heavily influential to eating behavior, while other student athletes described the negative influence of family when shaping food choice, as several student athletes cited:

> “My family growing up did not eat well at all. They were an ingredient’s family, like you had cheerios, and didn’t have the milk, but you still ate the cheerios. No one really cooked unless my dad grilled, and that was pretty much it. It was peanut butter and jelly other than that.” (SA15)
>
> “I’ve never really been a big fan of meat, even as a kid, my parents would try and get McDonald’s, or some other type of fast food and it just wasn’t for me.” (SA20)

Family was often referenced in enabling healthy eating behaviors by mimicking healthy food choices, particularly family members who played collegiate or professional sports. As some student athletes explain:

> "Like I said, my dad was my coach, and he also played college ball. He was so built and so muscular in college, you should see some of his pictures. So, I only follow what my dad tells me to eat, or at least I try to, so I don't really have to think about it." (SA02)
>
> "My dad played collegiate tennis, so I pretty much adopted his way of training, eating, and maybe even thinking about sports. I can remember in high school, he was always pushing me to run and stay in shape, but more importantly, to eat the rights foods to look and play at my best. So, his influence really stuck with me, even now." (SA06)
>
> "My dad was a collegiate soccer player, so he always groomed me and my sister to play, and that meant following his diet too, my mom didn't really care, because she worked, so she rarely even made large meals." (SA12)

There was also mention of the parental control of food using food rules with either restriction or obligation during the early life course of student athletes, as some students were reminded of those rules when making current food choices when it was said:

> "Yes, so the way my father grew up, he had to eat what was in front of him. That didn't make him picky, so I could see how I'm a picky eater now. Now my mom, she grew up and her eating behavior was different, because if she didn't like the food, she didn't have to eat it." (SA04)
>
> "I can always hear my mom saying, "you need to eat your vegetables first", so I guess in a weird way, I don't like to eat them because of that. But I do force myself to eat things like Brussel sprouts and broccoli, and I actually enjoy asparagus and green beans." (SA13)

Teammate Influence

Student athletes were also influenced through increased social activity with peers and

teammates. For some athletes, they looked for food guidance from peers or teammates living in close proximity as a form of modeling eating behavior, as several student athlete's mention:

> "Sometimes my friends and what they are going to eat or where they go to eat definitely influence me in terms of food." (SA07)
>
> "Well, I have my own apartment with a roommate, so we share the bill on groceries and food, so we try and keep those healthy things I said before, chicken and vegetables and stuff like that for meal prep." (SA16)
>
> "I know that me and my teammates are like carnivores and eat almost anything with meat and tons of protein." (SA21)

It was also predominantly seen that student athletes were reluctant to model eating behavior and food choices from their peers because of the perceived unhealthiness of choices, as most student athletes claim:

> "My teammates are probably the worst influences for food because they love pizza and chipotle, which can get expensive, and I live with a roommate off campus." (SA05)
>
> "My teammates are obviously bad influences if the coach is now telling us how to fix our diets, so yeah, I wouldn't take any nutritional advice from my teammates." (SA11)
>
> "I can say my teammates are terrible examples of people who could influence someone on eating. I hope I don't get in trouble saying this, but our team is only focused on training and not so much on eating." (SA19)

Some athletes also mentioned their food choices were based on the lack of performance displayed by teammates as a consequence of poor eating behaviors, as some athletes explained:

> "Like some of my teammates eat fast food literally every day, then come to practice dragging and not able to play as well." (SA02)

> "I understand that eating well will give me a competitive advantage on the field. Most of my teammates are not as strict, and their performance suffers." (SA14)

Theme Four: Contextual Factors of Food Choice

The contextual factors of food choice are those regarded as situational around the physical environment of the student athletes. Besides their intrapersonal, athletic, and interpersonal influences, the contextual factors were another element shaping student athletes' eating behavior, which includes availability, convenience, economics, and time restraints. As student athletes constructed their food choices, these contextual variables continuously contributed to food selection and eating behaviors.

Availability

The availability of food was found to be a strong determinant of food choice, as it was reported that student athletes had persistent opinions about the food availability provided in the DIII collegiate environment, which invariably affected food choice. When asked, "What's the current availability of food choices in your immediate living area?", responses were:

> "Well, the dining hall is where everyone eats that's on a meal plan, and those of us who are, have to get food from there or either Chick-fil-a or Starbucks in the student center. So, we all pretty much eat the same things because of the location." (SA02)
>
> "I live off campus, so I go to Food Lion and Aldi because they are the closest." (SA05)
>
> "If I have to buy food, then I buy it from Walmart because it is right down the road" (SA17)

There were also statements emphasizing the lack of availability of food as some explain:

> "Because there are little options and variation in food around here, I typically just pick what is available and costs the least" (SA11)

> "I'd say healthy wise, there's not a great selection of food, but there is some selection, but even then, the salads don't look appealing" (SA01)

It was also evident that student athletes were looking for campus dining facilities to better accommodate the availability of food, since they predominantly depend on campus foods for their food choices:

> "On campus, there could be better things. I usually try to pack my lunch, so I have things more readily available to me, so I would rather go off campus to get food." (SA10)
>
> "I guess I would have the dining hall have more food and adjusted times for athletes. Sometimes practice runs over the time the dining hall is open, so I'm left to find food on my own." (SA02)
>
> "I want consistency with the food in the dining hall. Like I said earlier, they always have protein, carbs, and vegetables, but sometimes throughout the day the consistency would be on and off. The dining hall would run out of food and serve food that was old. So, I would say I just need consistency with the availability of food." (SA04)

It was apparent that student athletes shared similar eating behaviors given the availability of food on campus.

Convenience

After availability, student athletes described convenience, or the physical access of food, to be a major determinant of food choice. When asked, "If you could make one change to the food availability on campus, what would it be and why?", several student athletes reported:

> "This is a small campus, so I don't know if accommodating an actual restaurant would be possible, but something close other than the dining hall and Chick-fil-A for food." (SA13)

> "If there could be more areas where we could get food, like more places where we can eat, not just in the dining hall or in the student center." (SA21)
>
> "I know this is a small campus, but I think having more than just the dining hall to get food, like, one of my friends from high school goes to UCLA, and while I know that is totally different, they have like healthy vending machines with fruits and vegan stuff, so something like that." (SA08)

As a natural consequence of sport and school commitments, many student athletes spoke about convenience as a critical influence in food choice, as several athletes explained eating whatever they deemed as the most convenient, when three athletes said:

> "I choose whatever is easiest and what I can get for the lowest cost and is the most convenient. Typically, it's either what is in my room, what I get in the dining hall, or whatever is open after practice." (SA17)
>
> "Sometimes I do feel super hungry, and I have to scrounge around and find food from wherever I can, I even go to the vending machines sometimes in the science building to get M and M's or a Reese cup." (SA21)
>
> "A bad day is probably whatever is in my room, which is nothing healthy, like Cheese-its, whatever is close to me." (SA02)

Fast food consumption was also described by the student athletes as the most convenient choice of food, which superseded any other determinant of food choice, as explained:

> "I love Panara bread, because I'm able to get more healthy meals. I feel like they have the healthiest fast-food choices." (SA09)
>
> "Dinner is usually fast food, let's say if I go to Chick-fil-a, my order is like two sandwiches" (SA01)

> "Obviously if we are on away games, coach will take us to the nearest fast-food restaurant because that's what's convenient, but not the healthiest." (SA06)

Economics

The economic feasibility and the cost of food was often expressed as a significant determinant of food choice. From many perspectives, what ultimately guided food choice decisions was based on the financial inexpensiveness of food:

> "Late at night, I choose food based off of price. I can get the most for eight dollars. Like cookout, you can get a ton for eight dollars, whereas at Chick-fil-a, I can only get like a sandwich and maybe a medium drink." (SA01)
>
> "The biggest thing for me is price. I'm not going out there to buying expensive fish, unless it's sardines." (SA07)

When asked, "Where do you buy most of your food and why?", several athletes explained the economic reasoning behind their food purchasing, when it was said:

> "I actually go to Aldis a lot, because I can get my fruits and vegetables cheaply." (SA10)
>
> "I try and stick to the groceries stores around campus, so I go to Food Lion mostly. They have the best prices on fruit, and they have rotisserie chicken which I love." (SA11)

In some cases, student athletes wanted to eat healthily, but due to economic constraints, they were not able to choose the healthier foods, as some athletes explain:

> "I mean, if I could afford to eat the really organic or really expensive meats I would, but I'm just a struggling senior." (SA16)
>
> "I try to stick to the cheap stuff, so where everyone else will get expense protein powders and stuff like that, I just get a gallon of milk and keep it in my room, and it's just as

good." (SA21)

The price and value of foods was also mentioned, as several athletes emphatically spoke about getting "the best bang for the buck" with statements like:

> "I do think it is important to choose the healthiest foods for the best bang for your buck…" (SA02)
>
> "I'll normally buy organic meat, but if I can save my spending allowance, I want to get the best bang for my buck." (SA10)

Additionally, student athletes commented on receiving financial support when guiding their food choices when athletes explain:

> "Well, my parents are supporting me financially, and allow me to get all the healthy foods and keep them in my apartment." (SA03)
>
> "I do live at home with my parents, and I'm lucky enough to do that, and they give me an allowance for food. (SA07)
>
> "Since my family supports me, I get most of my foods from grocery stores with fresh produce" (SA04)

Time Constraints

Many student athletes spoke about the time constraints surrounding food choice, specifically the absence of time to make, find, or acquire food. Athletes believed that "time" was a frequent determinant in the decision-making process of foods, as one athlete explained:

> "My most important types of food are anything that doesn't take a long time to prepare, because I always have practice or class or games, so I don't have a lot of time to make things. There is always something else better to do than cooking, so I really don't have enough time to prepare most of my meals." (SA08)

Sometimes, student athletes were often forced to make food choices incompatible with their other determinants of food choice (intrapersonal, interpersonal, athletic) due to the time limitations:

> "Well, I would probably say I choose some stuff because I have to get protein in, and other times it's because it's what I have, and then if I even have time to eat or make it." (SA12)

> "The only thing that is different is the amount because I literally have limited time for so much, but I do try every day to get my daily calories in." (SA19)

Another student athlete spoke about choosing something "fast" because of the lack of time as mentioned:

> "Dinner is usually fast food, just because of time, or I have limited amount of real food in my apartment." (SA05)

Often, student athletes would make hasty food choice decisions based on the time they had to eat, as several athletes mentioned choosing quick meals:

> "I normally don't eat in the mornings because of class, but I will have a Starbucks coffee for caffeine." (SA21)

> "If I'm eating actual food, then I'll make a bologna and cheese sandwich, whatever is quick." (SA01)

Additionally, when asked "Explain how your everyday life affects your food choices?", one athlete proclaimed:

> "Um, I would say as an athlete, well, especially me, I am so busy with classes and practice, that my life does create some issues when it comes to getting enough food in and making the right decisions." (SA04)

Factors Influencing Ability to Make Food Choice

While this study focused on the major determinants of food choice, another goal was to explore factors that influence the ability of athletes to make food choices in congruence with sports nutrition guidelines. Considering these factors, the interviews reflected a realistic depiction of the challenges athletes face when navigating food choices, and from these, the factors or barriers can be dissected into internal and external factors. The barriers and enablers identified in this research are relevant to the athletes, and the considerations of these factors were heavily influential in shaping their food choice.

Internal Factors

The internal factors of food choice can be characterized as those intrapersonal factors specific to the DIII collegiate environment, which are individualized and affect the ability to make food choices in alignment with sports nutrition guidelines. For student athletes, these factors can be captured by their sports nutrition knowledge, their individual health beliefs, and their emotional and psychological states. These internal factors were prevalent when student athletes approached the food choice process and likely contribute to their overall eating behaviors.

Sports Nutrition Knowledge

Student athletes' sports nutrition knowledge was seen as a main factor in student athlete eating behavior. The impediment of healthy food choices may be attributable to conflicting sports nutrition knowledge, as three student athlete's claims:

> "Me personally, my food choice doesn't too much affect anything because I'm still young, and I can get away with eating most things and not be too terribly affected by it." (SA13)

> "So, everything I'm taking in, I'm usually running off or burning off, whether that be from running or training with weights, so I don't too much worry about what I eat" (SA10)
>
> "I'm lucky because I'm constantly running, or training, or practicing, so I use up a lot of calories that I'm taking in, and I get to eat pretty much anything because I'm constantly moving." (SA21)

Additionally, when asked, "When it comes to regular food choices, have you changed your eating behaviors due to the environment", several student athletes echoed the lack of nutrition knowledge in shaping their food choices, when saying:

> "Over the past year I have for sure. My first three years here, I didn't even know how to eat or choose food to be honest." (SA04)
>
> "Yes, as a tennis player and avid runner, I had previously experienced unintentional weight loss because of exercising so much and not knowing how to eat properly" (SA06)

Conversely, student athletes were also enabled in their food choice by their degree of nutrition knowledge, which was found to be acquired through undergraduate nutrition classes, as several student athletes mentioned:

> "I put protein in my salads and drink protein shakes because I know that it helps with recovery. I'm currently in Nutrition, so it does help to make sure what foods help with my training." (SA20)
>
> "I know that I need to be consuming protein, carbs, and fats because I'm in nutrition right now, so I know that my food choice matters, but I've never put that concept into my own health." (SA08)

Consequently, while athletes' knowledge of sports nutrition was seen to either influence or detract from food choice, one student athlete was resolute about the importance of sports nutrition knowledge in the requisition of their eating behavior when it was asked, "How do you ensure that your food choices align with your personal beliefs", the response was:

> "Now that I've been through what I have, I believe all athletes, and all college kids for that matter should really be more knowledgeable of how they eat. I wanted to do this study because I clearly don't know how to choose the right foods, and I don't think I'm the only one. Some of my teammates have the same issue, but you would never know it because we don't talk about it." (SA03)

Emotional/Psychological Drive

Student athletes provided insight into the psychological drivers behind food choice, with some reporting feeling like their eating behaviors and food choices were determined by their emotions, as several athletes' claims:

> "I like to eat better because I genuinely feel better. If I'm eating crap, I feel like crap." (SA15)
>
> "I can also notice a difference in how I feel emotionally if I don't have a balanced meal, and I'll notice more fatigue or more headaches if I don't eat right or drink an adequate amount of water." (SA07)
>
> "I don't really think about my food choices if I feel yucky or out of whack" (SA11)

Some athletes also expressed choosing foods based on their "mood", when several said:

> "I think my food choice and the way I eat affects my mood, my thinking ability, and most importantly, how I perform on the court." (SA06)

> "Well, I would say my mood has a lot to play with what I choose, but I do feel like I try to keep in mind my goals." (SA10)

Another student athlete mentioned that a lack of food affected their mood and emotions because when asked, "In what ways do you think your food choice affects your health?", the athlete says:

> "Well, I can definitely tell a difference because if I'm hungry, I totally get angry and moody, and that usually means my day is going to be crappy, and practice will be that much worse too." (SA12)

Health Beliefs

Although student athletes describe emotional needs in enabling their eating behaviors, the athletes revealed strong opinions in the contexts of their "health beliefs" which were strong determinants of how they chose food. Student athletes commonly reported consuming foods based on those beliefs because when asked, "So how do you ensure that your food choices align with your personal beliefs?", several athletes responded with:

> "I think it reflects my personal beliefs because I'm really big on appearance, and it's been very engrained in me that people judge, and so I want to portray that I'm healthy and take care of myself, and so my food choices really affect that, and they align with that fact, that I want to be healthy and look it." (SA09)

> "I just avoid extremely processed foods, because in my opinion, I don't see how something that has been through machines and chemicals can possibly be good for the human body." (SA15)

The respective foods considered healthy were mentioned by a majority of the athletes, and these foods included vegetables, fruits, yogurt, oatmeal, meat, pasta, eggs, and water. As three athletes remark:

> "Well, the number one food that I like to eat is salmon, and any wild caught fish, because I'm just a seafood type of person, and the health benefits outweigh any other meat. My second choice is of course chicken, and I eat every vegetable known to man." (SA06)
>
> "I keep yogurt in my room because it has protein and a little sugar, just to get my day started. I have apple sauce, and I try and keep a variety of fruits, so I'll try to keep bananas, cuties, oranges, and stuff like that." (SA07)
>
> "Well, I try and keep healthy stuff in my room, like my usual oatmeal, yogurt, and whatever bananas or grapes that don't go bad, so I try to do that in my room." (SA08)

Additionally, the use of protein supplementation was perceived as healthy by most student athletes, when they said:

> "I normally do eggs or oatmeal in the morning, then I'll have my meal prep which usually consists of chicken or tuna for lunch, then I'll have a protein shake and a cheese stick before practice, and for dinner I'll have another prepped meal and right before bed a casein protein shake." (SA13)
>
> "I usually make a green smoothie in the morning with kale and strawberries, blueberries, and peanut butter. I also supplement with my own protein shakes after practice or after games." (SA20)

While student athletes spoke strongly about their "healthy" food choices, there were foods mentioned as unhealthy, as some students comment:

> "My only nutrition related belief is that processed foods are probably the worst for you, so I try to stay clear of everything in a bag or frozen." (SA01)

> "I don't like to keep processed food or a bunch of junk in the house. Like the only thing that is processed usually is like the freezer food or if things are not going well, I'm like, oh, it's time to heat something up and grab it and go." (SA18)

Additionally, other student athletes mentioned that their health beliefs align with an eating behavior from their parents who were "health conscious", as it was said:

> "So, we don't have any real religious beliefs, we are Christian. But for us, how I said my parents are very health conscious, I try and have foods that are cleaner, foods that have very few ingredients, so nothing processed, or more organic if I'm able to afford that." (SA10)

> "My dad is a health nut, so he wouldn't let me, and my sister eat a lot of candy, I can remember, when we went to the movies, we had to bring apples and oranges and like grapes in a zip lock bag, because he refused to get us candy." (SA12)

Although student athletes may be more likely to choose foods based on their health beliefs, some athletes were indifferent and did not have any beliefs in relation to health and food choice, as two athletes espouse:

> "I really don't have any personal beliefs regarding food, I eat when my body says to eat." (SA05)

> "I don't have any personal beliefs that would make my eating behavior different." (SA04)

External Factors

The external factors of food choice were those situated around the physical campus environment (DIII), where student athletes continuously made food choices based on their physical surroundings. During interviewing, student athletes commonly spoke about the

formidable role of the collegiate environment directly influencing their food choices, which were potential barriers to healthy eating behaviors. Among the external barriers, students found the overall DIII collegiate environment, the facilities and options for healthy food, and the sports specific scheduling were all conducive to impeding their food choices.

DIII Collegiate Environment

The DIII collegiate environment was acknowledged as having a crucial role in guiding the healthy eating behaviors of student athletes. When asked, "When it comes to regular food choices, have you changed your eating behaviors due to the environment, and if so, why?", several student athletes claim:

> "I would say my everyday life affects it heavily because my life revolves around soccer. Going to school, and really being in soccer, is what I'm here for, so that really influences the foods I pick, especially with protein being number one." (SA20)
>
> "Yes definitely, because at home, where it wasn't the best food, it was at least food I was making, I would make two sandwiches as opposed to going out and buying fast food, so the environment here definitely applies." (SA01)

Some student athletes commented on eating irregularly when starting college, primarily because of the collegiate environment, as several athletes explain:

> "To be honest, the hardest part of being here at Methodist is just getting enough food and finding the right things, so, my eating has been drastically affected here than back at home" (SA02)
>
> "I would say my eating has suffered because of school, just because I'm at the collegiate level playing sports, and I know I don't get the quality food that I need" (SA10)

> "When I moved out of the house and got settled on campus, my eating habits were instantly terrible because I was on my own and this campus is so small, so I ate out all the time" (SA15)

Ultimately, this specific DIII environment was also seen as a negative influence on eating behaviors, as two athletes explained:

> "I just think it's hard to be a college athlete sometimes because we are expected to play all these games, go to practice, go to class, maintain our grades, and also eat the right foods. For me, it's a struggle everyday trying to manage all of it. I'm glad I'm a senior and only have to finish this season, although I love the game of lacrosse and love playing with my girls." (SA03)

> "As an athlete we are supposed to theoretically eat well and have healthy food choices, but I can tell you, that is not the case. I think here at Methodist, since it's not really a big school, all of the students even the athletes eat the same dining hall or Chick-fil-a or Chipotle, pretty much the same thing." (SA16)

Dining Facilities and Options for Healthy Food

Within the DIII collegiate environment, the institutional food setting including the dining facilities and options for healthy food were salient factors in enabling and impeding food choices. The institutional food setting, namely the dining facility, was frequently mentioned as a strong determinant of eating behaviors. As one student athlete stated:

> "It's truly whatever the dining hall is serving, there's really no other options on campus as a freshman. You're not allowed to be in the apartments, and you have to room on campus for the first three years. It's impossible to have a kitchenette as a freshman,

> unless you're extremely lucky, or you have friends who are going places. So, this year, has really been dining hall." (SA07)

Student athletes also mentioned that the quality of the food at the campus dining facility was not satisfactory, specifically noting the cooking quality as a significant barrier to food choice, as some student athletes claim:

> "I would just like the dining hall to have better hours and better cooked food, because the way the food is, I don't know if it is overcooked or what, but it is not really that good." (SA17)
>
> "I think there is a problem with the dining hall, I feel like there's something about the way they cook the food. I feel like there's too much salt because I know myself and a lot of the other female athletes like when we would eat there we would have to go to the bathroom after an hour and then be hungry again." (SA18)

Additionally, some athletes commented on a lack of healthy options in the dining facility, which seemed to be a barrier of food choice when two athletes explain:

> "I would just have one day where it is just vegetarian and vegan friendly options in the dining hall, instead of constantly having pizza and things that we don't need as college athletes" (SA20)
>
> "If there could be more areas where we could get healthy food, like more places where there are healthy options, not just in the dining hall or in the student center" (SA21)

While some athletes found the dining hall and the options on campus to be contentious in relation to food choice, the availability and convenience of the dining facility was seen as an enabler or advantage as several athletes explain:

> "I would say that you can eat in the dining hall because there are a wide range of things in there and its close. I think they always have some sort of rice and some sort of meat, and they have things like fries and potatoes, oh and the salad bar is always there." (SA02)
>
> "There are no healthy options at any restaurants or fast food around campus, so I stick to the dining hall food, even though it's not great. I mean, it is right there, and the options aren't always bad" (SA15)

Interestingly, one student athlete recognized the expectations of the dining facility to be marginal, as it was exemplified in:

> "The dining hall is the dining hall, there is not much expectation there. The salad bar is questionable, and like I said, when they don't have horrible lettuce or whatever they call lettuce, I try to have that" (SA19)

Sports Scheduling

Along with the environmental aspects of the DIII collegiate environment, the nuanced aspects of sports, including the competition scheduling and time constraints of sports, were seen as a significant barrier to food choice. When asked, "Explain how your everyday life affects your food choice", several athletes implicate their sports schedule as it is explained:

> "My sports schedule is the one thing that really affects my eating, whether I have class early, or if we have practice late and I still must train. Basically, I have a routine every day, so I fill in those eating times with my premade meals, because I know I need to eat and have calories throughout the day." (SA06)
>
> "Well, I think as an athlete, I am way busier than someone who doesn't have to practice, do games, and go to class, so I would say it does. Again, I know I don't get enough in

> during the day, because of how much time I spend training and playing. I'm trying to work on it." (SA11)

Even though most student athletes spoke about their good intentions regarding food choice and healthy eating behavior, a lack of time between class commitments and sports practices made food choices challenging. As several athletes mention:

> "How my schedule is laid out, I can eat at like 11 am, but then I can't eat again before my 4:15 team practice, so my process has to be stricter with when I'm eating, because if I miss a meal, I'm just missing the meal, so I'd say that it affects it really big." (SA01)
>
> "My schedule is so hectic at times, and I am not able to get the right number of calories in during the day" (SA07)
>
> "Sometimes during the basketball season, practice would interfere with the dining hall hours, so as soon as practice ended you had to book it to the dining hall to make it for dinner. So, some nights like that it would unfortunately be fast food, which I understand isn't as healthy, but I have stuff in the dorm too." (SA02)

Additionally, some student athletes stated they were not getting enough to eat because of sports scheduling and requirements, which affected their ability to perform optimally and eat within sports nutrition guidelines:

> "I think my food choice has been affected more recently, because I know I'm not eating enough, especially with all the practices and games we have. I try my best to get the right nutrition in during the day, because I can tell a difference when I am full and energized." (SA12)
>
> "I've never really thought about how sometimes if I'm like super tired from practice or I wake up late, then I'm not really hungry, so my schedule and training can come in the

way of eating enough." (SA13)

Summary and Integration

This chapter contains the results from primary data collection and correlates the analysis back to the research questions. Twenty-one student athletes were interviewed for this study, and all interview questions were structured to understand the determinants of food choice and eating behavior of DIII student athletes. As it is consistent with the constructivist grounded theory methodology, data analysis was conducted in three phases including open coding, selective coding, and theoretical coding. During this analysis, the relationships between the open and selective codes lead to the formation of a theoretical framework answering the main research question, "What are the determinants of food choice among DIII student athletes?". The four themes summarizing the contributing factors that influence DIII student athletes' food choice include: individual factors (intrapersonal), athletic factors, social factors (interpersonal), and contextual factors (environmental). Additionally, there were barriers and enablers of food choice that were specific to the DIII collegiate environment, which satisfied answering the research sub question, "What internal and external factors influence the ability of athletes to make food choices in congruence with sports nutrition guidelines?". These factors were separated into internal factors, including the sports nutrition knowledge, emotional/psychological, and health beliefs, and external factors, including the collegiate DIII environment, dining facilities, options for healthy food, and the sports scheduling. Additional data on the prevalence of DE behavior and risk for clinical ED are also found in this chapter. Chapter five includes the discussion of data analysis contributing to the theoretical frameworks of food choice and implications of this study's results.

CHAPTER FIVE: CONCLUSION

Overview

The previous chapter outlined the constructivist grounded theory research analysis from primary data collection. This chapter will include discussions of major findings as referenced by the literature on the prevalence of DE behaviors and risk for ED among collegiate student athletes, the major determinants of food choice among DIII student athletes, as well as the barriers and enablers of food choice. There will also be a discussion on the theoretical model of food choice which emanated from the data, and the connections this study has with the guiding conceptual model. This chapter will conclude with a further discussion on the implications of practice, the limitations of the study, the recommendations for future study, and a conclusion of the resultant study.

Discussion

This qualitative study examined the determinants of food choice in DIII student athletes while additionally showing the factors influencing the ability to make food choices in congruence with sports nutrition guidelines. Furthermore, the study aimed to investigate whether student athletes in this population show DE behaviors and possible indicators of ED's. Through semi-structured interviews and thematic analysis, four primary themes were identified that captured the larger determinants of food choice in this population, and include: (1) Intrapersonal: Individual, (2) Athletic: Sports Specific, (3) Interpersonal: Social, and (4) Contextual: Environmental. These results provide a nuanced understanding of student athletes' experiences in choosing food and shaping eating behavior, while also presenting several practical implications of the barriers and enablers of making food choices in the DIII collegiate environment. From this study's results, the factors influencing the ability to make food choices is

bidimensional and comprised of internal and external factors, including the internal factors: (1) Sport Nutrition Knowledge, (2) Emotional/Psychological, (3) Health Beliefs, and external factors: (1) DIII Collegiate Environment, (2) Facilities and Options for Healthy Food, and (3) Sports Scheduling. These factors address the main research question and sub question of this study:

(RQ1): What are the determinants of food choice in NCAA Division III student athletes?

(RQ2): What factors influence the ability of athletes to make food choices in congruence with sports nutrition guidelines?

Interpretation of Findings

Disordered Eating Prevalence

In looking to understand the complexity of food choice and eating behavior in our cohort of student athletes, screening for DE and possible ED was necessary in illuminating the potential factors contributing to their etiology. To enable student athletes to support their health while optimizing their performance, the screening of ED risk was vitally important to this study. Considering the high prevalence of these disorders in literature, this study was novel in screening for DE and ED, as one study indicates that only 60% of DI schools reported screening athletes for eating disorders, while a mere 6% were using a validated tool for assessing ED's in the general population (Beals, 2003). This study used a modified eating behavior questionnaire that has been confirmed in literature and exhibits a high sensitivity score of 85% and a specificity score of 90% (Morgan et al., 2000).

The result from this study is confirmed with earlier research indicating ED pathologies are more common among female student athletes than males (Sundgot-Borgen & Torstveit, 2004). For female student athletes, previous studies have ED prevalence rates ranging from 0 to

27% (De Oliveira et al., 2010), with the highest rates in endurance sports (24%), technical sports (17%), and ball game sports (16%) (Sundgot-Borgen & Torstveit, 2004). Our study saw 45% of female athletes with positive eating behavior scores (based on Eating Behavior questionnaire score >2), which indicates a possible pattern of unhealthy food choices comparative to male athletes who showed a 20% positive score. The findings among male athletes have been confirmed by previous literature reporting 11% to 38% with a prevalence of risk for ED (Fragkos & Frangos, 2013; Veses et al., 2011). Despite athlete's generally reporting healthful food choices, there were still positive indications of disordered eating in both genders in the sample, which needs further research to establish if their perception of food choice is actual reality.

There are numerous factors in literature causing athletes to partake in disordered eating behaviors, and this study confirms that gender is one of the most obvious. However, other factors, like this study's intrapersonal factor of food choice and the intent to support dietary goals, may add to disordered eating behaviors apart from gender. Athletes choosing foods based on a particular body image or for athletic performance can be key factors in the development of disordered eating behaviors as confirmed by literature in Division I athletes (Sundgot-Borgen, 1994). Even though literature suggests that body dissatisfaction and the development of disordered eating may only be subject to athletes in higher levels of competition, this study proves that competition level may not be a limiting factor. DIII athletes are just as susceptible to disordered eating behaviors similar to athletes at higher levels of competition, as the results from the eating behavior questionnaire suggest. While this study's primary aim was to examine food choices and the prevalence of disordered eating behavior in this sample of DIII athletes, further identification of more factors leading to the risk of DE behaviors is instrumental in limiting the consequences associated with these behaviors.

In previous studies, the prevalence rates for ED differ depending on the level of sport and type of sport. Literature suggests that athletes in endurance, aesthetic and weight conducive sports, where body composition is believed to be a performative factor, have a greater risk for developing ED (Sundgot-Borgen & Torstveit, 2004). However, this study found that the prevalence of DE and risk of ED may extend to sports with the same metabolic demand on the athletes. For context, in a recent study of collegiate athletes, the results showed that cycling, wrestling, and basketball were among the highest fraction of athletes reporting a clinically significant ED questionnaire score (Gorrell et al., 2021). These sports have vastly different metabolic and nutritional needs, and to our knowledge, no other research has studied the prevalence risks for ED among sports based on the same predominant metabolic processes involved in the specific sport. Lacrosse, basketball, soccer, and tennis all share similar metabolic needs (anaerobic-aerobic), and athletes playing these sports must conform to these demands through their food choices and eating behaviors. Therefore, the results from this study indicate that studying ED risk based on the metabolic demands of the sport seems to be more sensible, as the results show that DIII athletes from lacrosse, basketball, soccer, and tennis choose foods based on the intrapersonal need to maintain their dietary goals and ideal body composition.

The Determinants of Food Choice

This study identified four themes that predominated among the determinants of food choice from the athletes interviewed. Using the food choice process (FCP) model used by Furst et al. 1996, a framework of food choice in DIII student athletes included intrapersonal, athletic, interpersonal, and contextual factors. These broad factors align with an earlier study by Stok et al. 2017, where the multifaceted determinants of food choice in the general population were classified into four categories including individual, interpersonal, environment, and policy

related factors. Similarly, this study saw individual, interpersonal, and environmental factors of food choice, but no policy specific factors. The framework of food choices from this study integrated student athletes' individual accounts of healthy and unhealthy eating behaviors, in combination with the factors influencing the ability to make food choice in congruence with sports nutrition guidelines. This study tried to broaden existing theoretical models of food choice, especially within the collegiate context, as two previous models only used Caucasian male athletes from the same sport (Smart & Bisogni, 2001; Long et al., 2011). The resulting theoretical framework from this study can be used as a heuristic in the requisition of eating behavior in athletes, that is, as a model that illustrates the determinants of food choice and aids in understanding the components of the process.

Theme One: Intrapersonal Factors

The results from this study show that DIII student athletes consider their intrapersonal needs when choosing food. This is consistent with an earlier framework for factors influencing eating behavior across general populations, which mapped the determinants of food choice into predictors of food decisions (Symmank et al., 2017). The intrapersonal factors of food choice in our sample include sensory appeal, dietary goals, health concerns, and meal consistency. Interestingly, these factors have also been found in nonathletes, which confirms previous literature indicating that college students value sensory appeal as being the most important when making food choices despite the environment (Kelly et al., 2013).

Based on the FCP model guiding this study, the personal factors of food choice are synonymous with those intrapersonal factors, especially the sensory appeal or taste of food. The personal factors of food choice within the FCP can be defined as those preferences based upon the physiological or biological characteristics of food (Furst et al., 1996), and student athletes

vehemently expressed the sensory appeal of food being the most salient when satisfying the biological needs of hunger. When referring to the coding table in Figure 1, the sensory appeal of food was the most common determinant mentioned during interviewing. Historically in literature, the most prominent factor of food choice in the general population is to satisfy biological hunger driven by satiety and appetite (Hoefling & Strack, 2010), which is consistent with our findings from the student athlete sample.

Among the intrapersonal factors of food choice, student athletes' dietary goals were also influential in shaping food choices. During interviews, student athletes spoke about their perceived dietary goals and how their food choices align with those goals. These dietary goals were focused on achieving body composition goals and were separate from the athletic factors of food choice and the need for sport performance. The influence of dietary goals was also seen in professional Australian football players, where the study implicated that the pressures associated with meeting dietary goals was a major influence in food choices (Jenner et al., 2021). In literature, the influences of food based on dietary goals can be categorized as "dietary individualism", where the choice of food is based on individualized influences of food choices that fit within their personal food and eating identities (Bisogni et al., 2002). This researcher is unaware of previous research exclusively examining the influences of food choices in DIII student athletes competing in metabolically similar sports such as lacrosse, soccer, tennis, and basketball. From the results, the dietary goals of these athletes can be seen as driving their food choices which directly affects their ability to compete within the sports metabolic requirements.

Another prominent intrapersonal factor seen throughout interviewing was the process of choosing foods based on health concerns and overall physical well-being. When referring to the coding table of common themes in Figure 1, the health concerns of student athletes seemed to be

the least of the intrapersonal factors of food choice mentioned during interviewing, despite previous literature reporting health concerns as a primary factor above sensory appeal (Birkenhead, 2014; Pelly et al., 2018; Heaney et al., 2008). In this study, several athletes' health concerns were centered around nutritional balance as a mitigation to potential morbidities like diabetes and cardiovascular disease. This has also been seen in previous literature surrounding athletes concerned with their "medical condition" when determining food choices (Birkenhead & Slater, 2015; Pelly & Thurecht, 2019). Additionally, in the context of health concerns, some athletes in this study avoided certain foods due to food allergies or intolerances, most notably lactose and gluten. These athletes expressed changing their overall food choice process to avoid gastrointestinal discomfort, which is commensurate with studies reporting on endurance athletes changing their overall eating behaviors prior to a race (Pfeiffer et al., 2012; Worme et al., 1990).

One of the most interesting findings within the intrapersonal factors of food choice was the need for meal consistency. Student athletes in this study defined the need for "meal consistency" as an attempt to choose foods on a repeated and regular basis, with the goal of alleviating the need to make conscious decisions about food. It is well documented that college athletes often determine food based on the convenience (Smart & Bisogni, 2001; Long et al., 2011), however within this DIII environment, athletes were adamant about making food choices to meet their nutritional needs, meet busy schedules, and allow the consistency of choices be made with minimal thought involved. Due to the added pressure of the DIII collegiate environment, many student athletes relied on meal consistency when determining food, which meant buying store bought and processed foods because of the reliance on consistency and convenience. In an attempt to balance the sports and academic requirements inherent in collegiate sports, student athletes used meal consistency as a moderating factor in making food

choices are easy and more convenient.

Table 3

Coding Table of Intrapersonal Factors of food choice with DIII student athletes

Intrapersonal Determinants of Food Choice	Total Combined References (n=21 interviews)
Health Concern	127
Dietary Goals	158
Meal Consistency (Pattern)	166
Sensory Appeal of Food	178

Theme Two: Athletic Factor

This study found that among DIII student athletes, the need for sport performance and the seasonal variations of sport were monumental determinants of food choice. There is evidence to suggest that food choices are influenced by performative factors in the DI environment (Long et al., 2011), and this sample of DIII athletes were similarly influenced by performance. Given the differences in the competitive demands of DI and DIII collegiate sports, the results show that DIII collegiate athletes place the same degree of importance on performance when choosing food. Furthermore, the results show the determination of performance-based food choices were varied depending on the phase of season, which is consistent with collegiate athletes who choose to be more lenient with food choices during the offseason (Smart & Bisogni, 2001).

In this study, the student athletes from lacrosse, tennis, basketball, and soccer placed a prominent level of influence on performance goals, which may be associated with the major metabolic necessity of food for those involved in these sports. Athletes who play anaerobic or power-based sports have been shown to exhibit less influence on food choices for performance, while those in endurance sports modify their eating behaviors for performance enhancement

(Smart & Bisogni, 2001). It seems that this study's sample of athletes who have the same metabolic requirements may place performance above all other determinations of food choice. This is an important determinant to further analyze, as it is common for athletes to restrict food intake or have patterns of DE for aesthetic or performative reasons (Anderson & Petrie, 2012). It is important to consider how the need for performance, one of the strongest determinants of athletic food choice, may lead to performance derived risk of DE and ED.

Table 4

Coding Table of Athletic Factors of food choice with DIII student athletes

Athletic Determinants of Food Choice	Total Combined References (n=21 interviews)
Need for Sport Performance	144
Sports Seasonal	131

Theme Three: Interpersonal Factors

DIII student athletes in this study provided insight into the interpersonal determinations of food choice, with many reporting their immediate social influences when choosing food. This theme of food choice is relevant in literature and agrees with the notion that the social act of eating is a prevalent influencer of food choice (Contento et al., 2006). Family and teammates were both seen as the main influences of food choice (refer to Figure 3), which is similar to a study by Trakman et al (2019) finding that 50% of Australian athletes (n=410) from both individual and team sports held family and teammates as the primary sources of motivation for food choice. From this study's findings, it can be suggested that DIII student athletes have a greater ability of choosing foods and meeting their nutritional goals when their family and teammates are influencing them.

Teammates were also seen as a negative influence on food choices. Student athletes commented on choosing foods counter to what their teammates chose, and athletes spoke about

their frustration when teammates failed to make healthy food choices. This is consistent with literature among professional athletes, who are more likely to choose foods that do not align with their dietary goals when influenced by teammates (Jenner et al., 2021). The student athletes who were outspoken about their intent to reach their nutrition goals often reported a lack of influence from their teammates to meet these goals. From this, it can be interpreted that a DIII student athletes' social network, especially within the team environment, can support or hinder food choices, particularly if teammates do not make informed food choices.

In addition to the positive and negative influences of food choice found in teammates, it was interesting to note that many of the student-athletes cited coaches as also having a negative influence on food choice. In literature, coaches are known as a source of credible information and knowledge generation about the sport's nuances and likewise can influence decisions amongst the team (Torres-McGehee et al., 2012; Long et al., 2011). Based on this study, there were more references made to family and teammates when determining food choices, while coaches were seen as more negative influences. In fact, athletes from this study described their coaches as "probably the unhealthiest people because they don't follow a good diet whatsoever" and "our coaches just eat whatever and they wouldn't really say anything about our food choices". These responses during interviewing are inconsistent with multiple studies reporting that coaches are sought after as a primary source of nutrition information in student athletes (Torres-McGehee et al., 2012; Long et al., 2011; Smart & Bisogni, 2001). Additionally, Torres-McGehee et al. (2012) found that coaches in DI, DII, and DIII do not have adequate nutrition knowledge to advise athletes in food choices. In the DIII environment, where there is a known disadvantage with a lack of resources and sports dietitians (Shifflett et al., 2002), the role the coaches play in eating behavior and food choice is an indispensable one. Although coaches are

responsible for the overall care of the team, and not meant to be experts in nutrition knowledge, possessing baseline knowledge and skills to adequately guide athletes on general sports nutrition is imperative. As a result, there is a need to integrate workshops and other nutritional education opportunities for coaches based on the recommendations from the ACSM's sports nutrition guidelines. These workshops and interventions can be focused on the theoretical frameworks of food choice from this study, as literature has expressed, effective nutritional interventions must rely on a theoretical framework which allows for a better understanding of the determinants surrounding the eating behaviors (Bartholomew et al., 2016).

Table 5

Coding Table of Interpersonal Factors of food choice with DIII student athletes

Interpersonal Determinants of Food Choice	Total Combined References (n=21 interviews)
Coach Influence	136
Peer/Teammate	138
Family	171

Theme Four: Contextual Factors

In this study, all the situational considerations incorporated in the food choice process, including the availability, convenience, economics, and time considerations of food, make the determinants of food choice a contextualized factor. In literature, athletes often adopt eating strategies that help them meet their energy needs, and these strategies are situated around different contextual factors including availability and convenience (Birkenhead & Slater, 2015). Likewise, DIII athletes in this study valued the availability and convenience of food the most, as indicated by Figure 4. The life of the DIII athlete is consumed with hectic school and sports schedules, which makes the availability and convenience of food the most important factors, with preference placed on easy to prepare meals or pre-packaged meals. This is consistent with

studies suggesting that many college students rely on the rate of convenience as important in food choice (Fitzgerald et al., 2010; Boek et al., 2012), especially athletes who plan food choices ahead of time to have food available after sports competitions or training (Long et al., 2011; Smart & Bisogni, 2001).

Beyond availability and convenience, a common influence in DIII athletes is the economics or cost of food. As described by the participating student athletes, frequently chosen foods were inexpensive and relatively cost effective based on budget, which is consistent with Marquis et al. 2005, reporting that college students prioritize cost over health. Unlike DI athletes who have resources available to assist with food (Torres-McGehee et al., 2012), the athletes of this study commonly mentioned their financial situation as a key determinant of food choice. DIII athletes do not earn scholarships giving them access to meal offerings and post-training snacks, unlike DI athletes, and the NCAA offers the least amount of financial assistance for nutrition resources to DIII athletic programs (Abbey et al., 2017; Jagim et al., 2021). Most DIII athletes commented on being on a meal plan and having limited finances for food, which is a considerable constraint when it comes to supporting health and making food choices. This is in comparison with collegiate athletes who make budget friendly food choices because of the economics of providing their own foods (Long et al., 2011). Nevertheless, while the research is limited in DIII collegiate sports, it is possible that student athletes place the economics of food as a higher determinant of food choice depending on their level of income and resources available to them.

Time considerations were also a contextual factor of food choice and could easily be related to every other determinant of food choice. Having enough time for food preparation, having enough time to eat food, and having time to find food were all common responses during

interviewing. As a result, it is easy to understand why many studies have reported that time is one of the most critical factors of food choice in collegiate athletes (Smart & Bisogni, 2001; Long et al., 2011; Burkhart & Pelly, 2010; Tam et al., 2019). In the collegiate context, time is salient due to the many commitments of student athletes including training, work, competition, and traveling requirements (Smart & Bisogni, 2001; Long et al., 2011), and in this sample, the athletes were heavily influenced by time and the eating opportunities they had.

Table 6

Coding Table of Contextual Factors of food choice with DIII student athletes

Contextual Determinants of Food Choice	Total Combined References (n=21 interviews)
Economics	139
Time	150
Availability	151
Convenience	174

The focus on the development of the theory behind food choice provided a rich framework that made it possible to discover the multiple determinants that athletes described to develop their own systems of food choice. Although in literature, some conceptions of eating behavior and food choice varied widely among athletes, the focus of this research was on understanding the specific determinants and influences of food choices in the DIII collegiate environment.

Factors Influencing the Ability to Make Food Choices

In addition, this research is one of the only studies that identified factors that interfere with food choice in the collegiate context. A student athlete's abidance to sports nutrition guidance is essential to health and performance; however, little is known about the factors influencing the ability to make food choices in congruence with sports nutrition guidelines. The findings present a complex set of factors in a DIII student athlete's environment that interact

with and often trigger internal and external influences in ways that promote, facilitate, or impede food choice. While this study understands the larger determinants of food choice in this sample, the results also helped explain the factors influencing the ability to make optimal eating behaviors in accordance with sports nutrition guidelines. This acquired understanding helped in the development of a robust theory driven framework to positively change the eating behaviors of DIII student athletes.

Internal Factors

The internal factors of food choice facilitating student athlete adherence to sport nutrition guidance included their nutrition knowledge, their emotional and psychological states, and their overall health beliefs. In literature, the importance of healthy food choices can be influenced by age, gender, education, and nutrition knowledge (Heaney et al., 2008). The nutrition knowledge of student athletes can be defined as the ability to apply sports nutrition information when choosing foods (Birkenhead & Slater, 2015). In this study, student athlete's nutrition knowledge was a key constituent in choosing food, which is similar to previous results from a sample of 331 DIII athletes who tested with low sport nutrition knowledge scores (Klein et al., 2021). Consistent with previous themes identified by Torres et al. (2012) and Long et al. (2011), some student-athletes in this study demonstrated a lack of knowledge about proper nutrition, making healthy food choices and how nutrition impacts their performance. Furthermore, while some student athletes expressed having adequate nutrition knowledge, it can be gleaned from interviews that athletes do not always put knowledge into practice. The sports nutrition knowledge of collegiate student athletes is not totally understood in literature as it applies to ensuring adequate food choice (Heaney et al., 2008), however, this study gives some support between greater knowledge and healthier food choices. Further investigation is needed in

extrapolating the correlation between eating behavior and nutrition knowledge, specifically considering the ancillary enablers in an athlete's food choices, like their emotions and mood.

Previous studies have examined the associations between emotional status and overall eating behavior but have rarely considered the correlations between food choices and emotion (Ashurst et al., 2018). In this study, there was a unique relationship between positive and negative emotions and food choices, as most athletes associated negative feelings with unhealthy food choices. The emotional drivers of food choice were characterized by concepts spoken through interviewing, including using food as stress relief and making food choices based off mood swings, highlighting how DIII athletes use food to manage emotions. This is consistent with a recent study conducted by Clermont et al. (2022), who reported that emotional eating was prevalent among athletes with psychological needs. Additionally, qualitative research on female collegiate cross-country runners mentioned attitudes of emotional indifference towards food intake, even though the athletes reported their desire for healthy food choices (Stickler et al., 2016). This study demonstrates that emotions play a decisive role in influencing DIII athletes' compliance to sport nutrition guidelines. Research within the DI environment reports over 30% of DI athletes (n=950) show signs of emotional eating behavior and risk for DE behavior (Wells et al., 2015; Shriver et al., 2016). This study also shows that the prevalence of emotional food choice within the DIII collegiate context is also prominent. The emotional determinations from this study should put emphasis on the complexity of DIII athletes' adherence to sports nutrition guidelines within the DIII environment, and in turn, illuminate the undesirable effects in eating behavior arising from emotional and psychological cues.

A student athlete's health beliefs were also internal factors when making food choices,

and there is limited research examining food choices and the health beliefs that drive those decisions in congruence with sports nutrition recommendations. Health is a widely known factor of food choice in the general population (Wardle et al., 2004; Pollard et al., 1998), and an athlete's health beliefs are often associated with health and better eating behaviors (Vartanian et al., 2012; Pollard et al., 1998). Health can have varying meanings relative to the individual, and the DIII student athletes from this study generally considered their health beliefs when making food choices, including greater intakes of fruits, vegetables, and fiber, which is consistent with a study examining individuals who value health as an indicator of eating behavior (Wardle et al., 2004). Additional conceptions of health beliefs were seen by DIII athletes in this study, with most citing performing well for their sport, and having the right "nutrition" for practice and training, while others reported avoiding processed or junk food, and avoiding unhealthy eating behaviors like take out or fast food.

Overall, this study found that while some health beliefs were consistent with current sports nutrition recommendations, including the inclusion of vegetables, fruit, and lean protein (Thomas et al., 2016; Rodriguez et al., 2009), other health beliefs were not, like the perception of processed or junk food. There were several athletes who reported processed foods as unhealthy, while also reporting continued intake of protein shakes and protein bars. This is likely possible because DIII athletes have a skewed view of what processed foods are, which can be attributed to the lack of nutrition knowledge that was seen as a critical factor in food choice. This misconception suggests that athletes in the DIII environment may need more education on how to evaluate the "healthiness" of foods nutritionally, so that they can have a better understanding of processed foods and their nutritional value.

Table 7

Coding Table of Internal Factors of Food Choice in DIII student athletes

Internal Factors	Total Combined References (n=21 interviews)
Nutrition Knowledge	129
Emotional/Psychological	139
Health Beliefs	140

External Factors

DIII student athletes in the current study repeatedly commented on the challenges and external factors of making food choices, including the DIII collegiate environment, the facilities and options for food, and sports scheduling. These factors involved making food choices based on the physical environment, location, or the facilities in which these decisions were made. In the DI environment, student athletes are afforded with vast resources that enable them to make better food choices, as a study in 2021 revealed: 49 million out of 613 million dollars was allotted to be dispersed between all DI colleges, with nutrition education listed as the primary area of focus (Wilson & Cervantes, 2023). This is in stark contrast to the DIII environment, where schools have very limited resources comparatively, and focus on being student-centered for those participating in sports (Klein et al., 2021). Unfortunately, because of these varying resources between NCAA divisions, to this researcher's knowledge, this is the first study to reveal the environmental factors seen specific to food choice in the DIII collegiate sports environment.

The DIII collegiate environment was commonly reported as being a factor influencing the ability to make food choices, as athletes repeatedly spoke about how "small" their school is and how difficult food choices were because of the environment. This sentiment in the DIII environment can be explained by a study by Hull et al. (2016), which examined 383 (n=240 female; n=143 male) DI student athletes on the influences of their dietary habits, and found that

while DI athletes had better outcomes with the assistance of sports dietitians and resources on campus, DIII athletes in comparison are limited in nutrition resources, which underscores the importance of nutritional literacy in DIII athletes when making food choices. Additionally, some of the athletes in this study exhibited poor nutrition knowledge in line with sports nutrition recommendations, similar to findings in another sample of student athletes (n = 149 males, n = 181 females; n = 1 no sex indicated) spanning multiple DIII institutions (Klein et al., 2021). Given the results from this study and the fact that DIII athletes have incomparable nutrition resources like those in DI institutions, the DIII environment can likely play a larger role in impeding student athletes food decisions. DIII athletes who do not have environmental support have an overall lack of nutrition knowledge and understanding of how food choices can be pivotal to performance and health.

Within the DIII environment, this study's student athletes experienced added factors influencing the ability to make food choice, including the dining facilities and options for healthy food. The DIII food environment was commonly reported as having very few options for food, especially those perceived healthy foods that athletes wanted for performance. While belief is not always indicative of reality, this study's results are grounded in the descriptions from athletes in choosing foods. So, while there may have been "healthy" food options, the athletes' perceptions of healthy food options were assessed. This is consistent in two studies with both male and female college students (n=112; n=35, respectively), concluding the university food environment lacks options for healthy food and as a result, students are seen overeating or consuming calorie dense foods (Hebden et al., 2015; Sogari et al., 2018). During interviewing, student athletes spoke about the strong role of the dining facility influencing their food choices, with some choosing foods based on availability, and others being dissatisfied with the choices altogether.

This could be why results from a qualitative study by Deliens et al. (2014), found that 35 college student participants increased their means of food acquisition from the university dining hall to the least healthy types of fast-food options, because of the disparities within the dining facility. It can be hypothesized that DIII dining arrangements, to include the food selection, food preparation, food availability within the facility, and sport nutrition knowledge might be moderating the relation between sports recommended food choices and unhealthy eating behavior. A moderator can be defined as the overall strength of connection between two variables (MacKinnon et al., 2007). While every DIII dining facility is not the same, the results from this study show how these facilities should present as opportunities to promote student athlete food choice and eating behavior, as opposed to potential barriers. Research suggests that dining facilities should encourage the consumption of healthy food options, by increasing the availability of healthy food choices, as well as providing food education and preparation classes, which will make student athletes more aware of food choice and sports nutrition recommendations (Stok et al., 2018).

In addition to providing on-campus dining facilities, the DIII university studied was in proximity to local fast-food restaurants and convenience stores. Student athletes reported being limited in food choice, and their self-determined eating schedules were hampered by the dining hall hours, their class schedule, and most importantly, their sports schedules and commitments. In this way, DIII athletes are comparative to DI athletes, particularly related to their lack of control over eating schedules. One study points out that DI athletes (n=678) face the same barriers of food choice because of the nutritional challenges of the required busy sports scheduling and frequent travel (Parks et al., 2018). Athletes in this study expressed that their demanding sports schedule was time consuming, so time for cooking and shopping became

limited, which supports this external factor being the third most crucial factor influencing the ability to make food choices. Sports scheduling was also seen as a barrier to food choice in a study on food choice decisions of DI athletes (n=14) (Eck & Byrd-Bredbenner, 2021). The results from this study suggest that in the DIII sports environment, there seems to be limited eating possibilities throughout the day to consume the requisite foods that is recommended for sports specific metabolic needs and sports nutrition guidelines. This is an interesting finding, as literature describes the focus in DIII schools being student-centered, so sports competitions are valued less than academics and campus life (NCAA, 2016).

From these results, it can be guessed that DIII student athletes may not have a balance between eating opportunities and sports scheduling, which can also be seen in their counterparts in DI and DII schools (NCAA, 2017). Balancing the demands of sports and academics is an inherent part of the student athlete life, and DIII athletes in this study commonly mentioned balancing school, sports requirements, and their eating behaviors. In literature, student athletes have been shown to have an inability to shop or cook for themselves and have little knowledge of proper nutrition, primarily due to living on their own for the first time and the responsibility of feeding themselves (Quatromoni, 2008). While the collegiate environment can be daunting in terms of the balance between academics and athletics, it is important to recognize that this external factor of food choice can be moderated by the athlete's ability to manage their time and commitments. It is critical for student athletes to explore the various resources on campus to support their balance of academics and sports, including utilizing academic advisors to help navigate the academic load, seeking athletic mentors who can offer guidance on proper athletic responsibilities, and using campus counseling services if needed, to help manage stress or other

mental health issues (Quatromoni, 2008). In order to mitigate the environmental and external factors of food choice, athletes must proactively seek out ways to enable balance between athletic commitments and eating behaviors.

Table 8

Coding Table of External Factors of Food Choice in DIII student athletes

External Factors	Total Combined References (n=21 interviews)
Sports Scheduling	137
Facilities and Options for Food	139
DIII Collegiate Environment	152

Theoretical and Empirical Implications

The determinants of food choice and the reasons behind eating behavior is a multifaceted concept in literature, with performance being one of the most salient factors for elite athletes (Stok et al., 2017; Smart & Bisogni, 2001; Long et al., 2011). In literature, the development of theoretical models examining athletes is a new concept, and to this researcher's knowledge, none use DIII student athletes from different sports in the development of food choice theory. The theoretical implication from this study includes an environmental dimension which is absent from other theoretical frameworks of food choice. This study sought to broaden the existing models of food choice for collegiate athletes, as two earlier studies use only male Caucasian athletes from ice hockey and football, and only in the DI and DII setting (Smart & Bisogni, 2001; Long et al., 2011). The theoretical determinants of food choice in DIII athletes provide future researchers with the ability to study the multiple factors that influence athletes across the remaining divisions of the NCAA, both DI and DII.

For the improvement of collegiate athlete eating behavior, student athletes must receive academic support, support from their coaches and support staff, and quality medical and

counseling care from the college. To enable these improvements, the college athletic department should work to interconnect student athlete resources, support services, and nutrition education, which would encourage the use of these resources that is vital for student athlete eating behavior. Nutrition knowledge is viewed as the most critical factor regarding food choice in literature (Birkenhead & Slater, 2015; Trakman et al., 2016), and focusing on the nutritional knowledge of student athletes, as well as the coaches and staff, will improve the overall awareness and understanding of the nutritional strategies suited for guided food choice and eating behaviors. Further research is needed to find targeted interventions to increase the nutritional knowledge of both athletes and coaches. There must be continuity in supporting informed dietary food choices, and increasing the nutrition knowledge of coaches and support staff is imperative in supporting student athletes. If coaches had a greater baseline of sports nutrition knowledge, then student athletes could use them as a resource, as opposed to a negative influence of food choice. This would create an open line of communication helping athletes in their intent to make better food choices and increase their overall physical well-being. In literature, the most modifiable determinant of food choice in athletes is nutrition knowledge (Trakman et al., 2016), and the theoretical framework from this study can give added context when analyzing the factors of food choice. In a meta-analysis of over 300 studies examining the impacts of nutrition education, the researchers found that improvements in nutrition knowledge increased by 33%, in nutritional attitudes by 14%, and overall eating behaviors by 19% (Murimi et al., 2017). However, the researchers concluded that the failure to base the research on theoretical models was a major "shortcoming of the research". So, to this researcher's knowledge, most of the literature on the use of nutrition education does not have a clear theoretical base from which to identify the specific variables that can positively affect eating behavior. From this study, the theoretical

frameworks of food choice can guide the selection of factors to target in an educational intervention, that is, the student athletes intrapersonal, athletic, interpersonal, and contextual factors of food choice. These factors will be helpful as they provide guidance on how to make the nutritional education efforts of both athletes and coaches more effective. If nutrition education can facilitate the adoption of better eating behaviors conducive to sports nutrition guidelines, then a combination of lived experiences and the theoretical frameworks of food choice must be used. As Gillespie and Brun (1994) insist, the progress of nutrition education calls for more explicit use of theory, along with more research in the mediating factors behind the effectiveness of nutrition education programs (Contento et al., 1995). The theoretical implication from this study can improve the between study comparisons of eating behavior and sports nutrition knowledge in college athletes, by examining the differences in data captured in this study.

Major Implications

The determinants of food choice seen in this study and the qualitative design using constructivist grounded theory has extended the understanding of athlete's food choices. Previous research has indicated that athletes are susceptible to DE and risk for clinical ED (Bratland-Sanda & Sundgot-Borgen, 2013), and that athletes fail to meet energy needs in congruence with sports nutrition guidelines (Thomas et al., 2016; Rodriguez et al., 2009). Through the use of an eating behavior screening questionnaire and semi structured interviews, this study uncovered the factors of food choice in the DIII setting. The findings suggest that inadequate eating behavior and food choice is not a single factor decision, and there are other major factors influencing the ability to make food choices in congruence with sports nutrition guidelines that are specific to the environment.

In general, the results from other qualitative studies in food choice have reported the social environment, the sport or team culture, and the experience of the athlete are all primary factors of food choice (Smart & Bisogni, 2001; Long et al., 2011; Juzwiak, 2021). The results from this study support those findings, but also implicate the DIII collegiate environment and student athletes' emotional and psychological status may also impede the ability to make adequate food choices in line with sports nutrition guidelines. Additionally, this study confirms the health aspects of food, and the associated performative effects are highly considered when DIII athletes make food choices. The determinants of food choice in DIII student athletes can help coaches, support staff, and college administrators understand the fragmented relationship between a college athlete's food choice and nutrition knowledge, specifically for the proper intake for performance and health. More research on the determinants of food choice can raise awareness on what areas of focus would be useful in a nutrition education intervention in college athletics.

This study also implicates the need to ask student athletes about their food choices and eating behaviors in order to develop the necessary interventions across the campus environment. Uncovering the multifaceted determinants of food choice proves that research should not only focus on the individual factors, but also the ecological or environmental aspects into the analysis of food choice. After receiving feedback from athletes about their determinants of food choice, universities can make environmental modifications to help athletes' eating behaviors within sports nutrition guidelines. Environmental modification including targeting the availability, convenience, and cost of perceived unhealthy and healthy foods can be highly influential for student athlete food choice. Using this study's theoretical framework combining the intrapersonal, interpersonal, athletic, and contextual factors of food choice, effective and tailored

intervention programs can focus on these factors driving healthy eating behaviors. The framework of factors influencing the ability to make food choices can also help colleges gain insight into how they can support making healthy food choices, by addressing those internal and external factors behind unhealthy eating behaviors. For athletes to be successful in college, acknowledging the core themes of food choice is needed, and the present study meets this need.

One of the primary implications from this study is the usefulness of screening athletes for DE and risk for ED. This study added new insights into the systematic screening of athletes, with a focus on the assessment and management of eating behavior in collegiate athletes. From this study, the integration and use of routine screening with validated instruments and interviewing may help show DE behavior, which can potentially prevent severe outcomes and clinical cases of ED's. In the DIII environment, it is critically important that athletes have a positive nutrition environment, where the coaches and support staff are educated about ED symptoms and how to leverage the college's student support services if there is potential risk. The role of coaches is to support the challenges athletes face when making food choices or showing patterns of disordered eating, by seeking the resources athletes need to aid with their food related issues. Athlete's and their coaches can use the food choice frameworks from this study to increase knowledge and awareness of DE behaviors, and as literature suggests, this transformation of nutritional knowledge should be supported by a commitment from coaches and support staff (Lichtenstein et al., 2022). The food choices and eating behaviors of college athletes will not align with sports nutrition guidelines unless there are structural changes in the NCAA to ensure the coaches and environment support the athletes. One noted issue within the studied DIII environment is that coaches were often limited in their nutrition education. Upon completion of data collection each coach was provided with guidelines on how to detect, manage, and address DE and ED

possibilities in athletes (see Appendix F). These guidelines were established by the National Eating Disorder Association and entitled the 'Coach and Athletic Trainer Toolkit' (Lichtenstein et al., 2022). The purpose of these guidelines is to improve the nutritional knowledge of coaches and staff in the detection of ED symptoms, while also encouraging them to send athletes to health professionals for full evaluation and treatment if needed. This study illustrates the importance of the coach to student athlete relationship in DIII collegiate sports. Coaches equipped with an understanding of the complexity of food choices and eating behaviors are essential in the development of nutritional interventions and policies that improve overall student athlete health and wellness.

Improvements to Food Choice

During interviews, student athletes communicated several suggestions for improvements for the DIII campus environment. Student athletes wanted more on-campus resources for the acquisition of food, such as creating a food market in the athletic buildings for the purchase of healthy foods and snacks. Another suggestion was expanding the dining hall hours, specifically for student-athletes. According to Brown et al (2023), 45% of the student athletes studied (n=787) indicated that dining hall hours were always in conflict with practice or competitions. Conflicting dining hall hours may be factors to student-athletes' food choice disparity despite having a place for meals. Ensuring the dining hall hours are suitable for athletes may help alleviate this factor influencing the ability to make food choice.

Strengths

The qualitative methodology of constructivist grounded theory is an important strength of this explorative study in food choice among DIII student athletes. The nature of qualitative research allows for more in-depth understanding about a phenomenon, and as Sallis et al (2006)

suggest, it allows for the examination of "what" but also the "why" and "how". The use of an inductive thematic approach allowed for the construction of a theoretical framework focusing on the determinants of food choice in DIII student athletes. In contrast to quantitative surveys, the interviews with student athletes held a naturalistic and conversational access to data collection, which allowed for better insight into the determinants behind student athletes food choices (Silverman, 1997). The semi-structured interview guide was designed to address the gaps in literature focusing on food choice, and reviewed by other qualitative researchers in nutrition and dietetics.

Limitations

While the results and strength of this study expand the existing information in food choice research, the study's limitations should be recognized. All the student athletes in this study were from one DIII university in the southeastern region of the US, and were purposefully selected through their involvement in lacrosse, soccer, basketball, or tennis, so the results may not be generalizable to other collegiate athletes in DI and DII. In addition, the sample size, (n=21), may also limit the generalizability of the results. Another limitation involves the integrity of student athletes' responses during interviewing. Due to the volunteer nature of this study and the relationship of the researcher as adjunct professor within the DIII university studied, it is unknown whether athletes were biased and provided true and honest responses. Despite these limitations, redundancy in thematic analysis was seen after 21 interviews, suggesting data saturation was realized and no further interviews were needed (Laub, 1998). To mitigate the risk of confirmation bias, a separate qualitative researcher analyzed codes and themes, and confirmed the analysis and formulation of the study's theoretical frameworks of food choice.

Recommendations for Future Research

While this study examined the determinants of how DIII student athletes make food choices, it did not report on body composition or actual dietary intake and nutritional status. In addition, there was no objective measure quantifying the results that convey the most influential determinants of food choice. Therefore, future research should quantitatively measure the importance and value of each determinant within the collegiate setting of choice (DI, DII, DIII). There also needs to be further quantification of the specific factors that influence the ability to make food choices that are unique to the athlete population. Future mixed methods studies could use the validated eating behavior questionnaire from this study and survey all sports within the collegiate context for an indication of DE and ED risk and the correlations between different food choices. The outcomes of this study illustrate that more research is needed in the use of validated measurement tools and the robust screening of eating behaviors to explore the relationship between food choices and diet quality in collegiate athletes. These future studies can enable the critical interpretation of the multifaceted determinants of food choice in student athletes, leading to healthier, and more informed food choices in college and in their future lives. Additionally, due to the variances between NCAA divisions, research should further assess the nutritional knowledge of college athletes and if their beliefs of healthy food choices are actual reality. The inconsistencies between food choices and the perceived options of healthy food show that athletes may have poor nutrition knowledge, but also a poor perception of what "healthy" food choice entails.

Conclusions

The result from this study extends the understanding of food choice and eating behavior in college athletes. The qualitative design of this study explored and found the determinants of

food choices made by DIII athletes that, to the best of this study's knowledge, has only been examined by quantitative survey. A theoretical framework of food choices was developed, and student athletes were found to be influenced by intrapersonal, athletic, interpersonal, and contextual factors. There was also a relationship between the determinants and the factors influencing the ability to make food choices, which seemed to be moderated by the DIII environment, including the dining facilities, options for healthy food on campus, and the DIII sports scheduling. When student athletes enter the DIII collegiate sports environment, they must be aware of the challenges to make healthy food choices, and the potential risk of disordered eating behaviors. Awareness and knowledge on how and why athletes eat what they do sheds light on the complexity of the food choice process, and future research is needed to discover how to facilitate behavior change and remove barriers leading to healthier, more informed food choices now, and in the future.

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Appendix A: Information Sheet

Information Sheet

Title of the Project: A Qualitative Examination of Food Choice Among Division III Student Athletes using Grounded Theory

Principal Investigator: Paul Craig, Doctoral Candidate, School of Health Sciences, Liberty University

Invitation to be Part of a Research Study

You are invited to participate in a research study. To participate, you must be a full-time student, you must be 18 years of age or older, a freshman/sophomore/junior/senior student athlete participating in basketball, tennis, soccer, or lacrosse. Both male and female student athletes are asked to participate in this study. Exclusion criteria include student athletes outside of the above-mentioned parameters, and those student athletes who currently have a clinically diagnosed eating disorder. Taking part in this research project is voluntary.

Please take time to read this entire form and ask questions before deciding whether to take part in this research.

What is the study about and why is it being done?

As part of doctoral graduate research, the purpose of this study is to improve the understanding of athletes' eating behavior by determining the influences of food choice in Division III student athletes. This study is necessary because there is a lack of research in sports nutrition literature concerning Division III student athletes.

What will happen if you take part in this study?

If you agree to be in this study, I will ask you to do the following:

1. You will be asked to complete an online demographic questionnaire that should last between 5 to 10 minutes.
2. Once identified to participate in the study, student athletes will be asked to conduct individual interviews lasting between 30-45 minutes focused on the determinants of food choice and eating behavior.
3. The interviews will be conducted with the lead researcher in a private, secure, office or classroom at the university's athletic center.
4. The interviews will be audio-recorded (only) through Zoom inc. Services, for data accuracy and redundancy.
5. The interviews will be transcribed and emailed to the student athletes for confirmation and validation, also known as member checking. Once member checking is completed, data analysis will continue until saturation.
6. The interviews will be analyzed to identify themes, and follow-up interviews may be needed based on these themes and trends.

How could you or others benefit from this study?

Participants should not expect to receive a direct benefit from taking part in this study.
Benefits to society include an increased knowledge and understanding of how student athletes approach sports nutrition and the impact it can have on health and performance.

What risks might you experience from being in this study?

The expected risks from participating in this study are minimal, which means they are equal to the risks you would encounter in everyday life.

How will personal information be protected?

The interviews and transcribed data of this study will be kept private. Published reports will not include any information that will make it possible to identify a subject. Research and interview records will be stored securely, and only the researcher will have access to the records.

- Participant responses will be kept confidential by replacing names with pseudonyms.
- Interviews will be conducted in a location where others will not easily overhear the conversation.
- Data will be stored on a password-locked computer, and in an external hard drive in a locked cabinet in the researcher's office. After five years, all electronic records will be deleted.
- Recordings will be stored on a password locked computer and in audio storage files on an external hard drive used for university research. These recordings will be kept until participants have reviewed and confirmed the accuracy of the transcripts, and then they will be deleted after five years.

How will you be compensated for being part of the study?

1. Participants will receive an Amazon gift card for inclusion in the study
   2. The monetary value of compensation will be 10$
   3. All participants who complete screening AND interviewing will be compensated
   4. Participants will be given the option to enter their email address at the end of the interview to receive compensation. Upon successful completion of the interview, the researcher will send a $10 Amazon gift card to the participant's email. Participants' contact information and survey data will be stored separately and their personally identifiable information will not be published or presented publicly.
   5. Compensation will prorate based on the completion of both screening and interviewing and will accrue over the course of the study.
   5a. Subjects that withdraw prior to completion of the study will not receive compensation for study activities that have been completed.

Is study participation voluntary?

Participation in this study is voluntary. Your decision whether to participate will not affect your current or future relations with Liberty University or Methodist University. If you decide to participate, you are free to not answer any question or withdraw at any time during the interview process without affecting those relationships.

What should you do if you decide to withdraw from the study?

If you choose to withdraw from the study, please contact the researcher at the email address/phone number included in the next paragraph. Should you choose to withdraw, data collected from you during the interview will be destroyed immediately and will not be included in this study. Your responses will not be recorded or included in the study.

Whom do you contact if you have questions or concerns about the study?

The lead researcher conducting this study is [redacted]. If you have questions later, **you are encouraged** to contact him at [redacted]You may also contact the researcher's faculty sponsor, [redacted].

Whom do you contact if you have questions about your rights as a research participant?

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the IRB. Our physical address is Institutional Review Board, 1971 [redacted] our phone number is [redacted] and our email address is irb@liberty.edu.

Disclaimer: The Institutional Review Board (IRB) is tasked with ensuring that human subjects research will be conducted in an ethical manner as defined and required by federal regulations. The topics covered and viewpoints expressed or alluded to by student and faculty researchers are those of the researchers and do not necessarily reflect the official policies or positions of Liberty University.

Appendix B: Email to Student Athletes

Do Food Choices Matter? - Research Opportunity

Greetings,

My name is Paul Craig, and I'm an Adjunct Instructor in the Doctor of Physical Therapy Program, and I have been working on a new research study and I need your help.

The purpose of my research is to determine the influences of food choice in Methodist University student athletes, and I am writing to invite you to join my study.

To participate, you must be a full-time student, you must be 18 years of age or older, a freshman/sophomore/junior/senior student athlete participating in basketball, tennis, soccer, or lacrosse. Both male and female student athletes are asked to participate in this study. Exclusion criteria include non-athletes or those with a clinically diagnosed eating disorder. Taking part in this research project is voluntary.

Participants, if willing, will be asked to participate in an online demographic survey lasting between 5 to 10 minutes and a 15–20–minute interview focused on your determinants of food choice and eating behavior.

To participate, please contact me directly at [redacted]. We can set up an in-person interview on campus based on your availability.

An information sheet will be sent to student athletes who are interested in the study. The information sheet contains additional information about my research. You will need to read the entire information sheet before deciding whether you would like to participate.

Participants will receive a 10$ Amazon gift card for inclusion in the study. Only participants who complete screening AND interviewing will be compensated.

Thanks for considering participation!

Appendix C: Eating Behavior Screening Questionnaire

This is a brief questionnaire that is looking at your inner attitudes and feelings about food. Please read the questions below and check Yes or No as appropriate.

1) Do you ever make yourself throw up (or use laxatives, water pills or exercise) because you feel uncomfortably full?

- ❑ Yes
- ❑ No

2) Do you worry you have lost control over how much you eat?

- ❑ Yes
- ❑ No

3) Have you recently lost or gained more than 10-15 pounds in a 3-month period?

- ❑ Yes
- ❑ No

4) Do you believe yourself to be fat when others say you are too thin?

- ❑ Yes
- ❑ No

5) Do thoughts and fears about food and weight dominate your life?

- ❑ Yes
- ❑ No

6) Do you feel bad about yourself because of your weight, shape, or eating habits?

- ❑ Yes
- ❑ No

Morgan JF, Reid F, Lacey JH. The SCOFF questionnaire: assessment of a new screening tool for eating disorders. BMJ 1999; 319:1467.

Modified SCOFF developed by Dooley-Hash, S. and Banker, JD, 2011, Center for Eating Disorders, center4ed.org

Appendix D: Athlete Food Choice Questionnaire

32-item AFCQ (Athlete Food Choice Questionnaire)

Please answer the following statements in relation to how much they influence your food choices. This could be a single meal or individual food or drink (beverage).

My food choices can be influenced by:	Frequency				
Nutritional attributes of the food	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
The presence of vitamins and minerals in the food	1	2	3	4	5
The natural content of the food	1	2	3	4	5
The health or nutrition claims about the food	1	2	3	4	5
The nutritional content of the food (protein, fat carbohydrate)	1	2	3	4	5
Whether the food is a wholefood	1	2	3	4	5
Emotional influences	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
How sad I feel	1	2	3	4	5
How stressed I feel	1	2	3	4	5
How angry I feel	1	2	3	4	5
Eating to comfort my emotions	1	2	3	4	5
Food and health awareness	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
My ability to plan my foods ahead	1	2	3	4	5
My ability to cook for myself	1	2	3	4	5
My knowledge of nutritious foods	1	2	3	4	5
My awareness of the foods I already consumed today	1	2	3	4	5
Influence of others	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
What other athletes in my sport are eating	1	2	3	4	5
What my friends are eating	1	2	3	4	5
What my family is eating	1	2	3	4	5
Usual eating practices	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
How familiar the food is to me	1	2	3	4	5
The foods that I've grown up eating	1	2	3	4	5
My cultural style of eating (e.g. S. American, Indian, Western)	1	2	3	4	5
Weight control	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
If I am trying to lose or gain weight	1	2	3	4	5
If the food is beneficial for my weight goal	1	2	3	4	5
How happy I am with my current weight / body image	1	2	3	4	5
Whether I am in the off season (no competitions or intense training for a period of time)	1	2	3	4	5

My food choices can be influenced by:	Frequency				
Food values and beliefs	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
If the food aligns with my values for animal welfare (i.e. no animal products/vegan, cruelty-free raised animals)	1	2	3	4	5
My religious food beliefs	1	2	3	4	5
If the food is sustainably produced	1	2	3	4	5
Sensory appeal	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
The flavour of the food	1	2	3	4	5
The taste of the food	1	2	3	4	5
The sensory appeal of available foods	1	2	3	4	5
Performance	**Never**	**Rarely**	**Sometimes**	**Often**	**Always**
My need to fuel my body for competition	1	2	3	4	5
My need to feel energetic for training & competing	1	2	3	4	5
My need to fuel my body for recovery	1	2	3	4	5

Thurecht, R. L., and Pelly, F. E. (2021) The Athlete Food Choice Questionnaire (AFCQ): Validity and Reliability in a Sample of International High-Performance Athletes. Med. Sci. Sports Exerc., Vol. 53, No.7.

Appendix E: Semi Structured Interview Guide

Student Athlete Interview Guide

Introduction-

Good afternoon and thank you for participating in this study. As explained, this research examines athletes' food choice and the congruence of these decisions with sports nutrition guidelines. This study is aimed to improve the understanding of food related beliefs and practices to enable the requisition of sports nutrition for the enhancement of performance, while also protecting athletes' health.

During this interview, I will be asking about your food choices: what you eat, where you get your food, what types of food you eat, and what you think about healthy food. The information you provide is important and will help us better understand issues related to food choices and the Division III student athlete.

I will be recording this interview, so we have an accurate record of what you say. However, your name and personal information will remain confidential. Also, feel free to let me know if you would like to skip any questions, take a break from the interview, or end this interview at any time. Any questions before we start?

Interview Questions-

I will now begin the interview concerning your food choices and eating behaviors.

1. What are the most important foods for you?
2. In what ways do you think your food choice affects your health?
3. Explain why an athlete's food choice would be different from a regular student. Is there a major difference, and if so, why?
4. Please describe your food and eating behaviors on a regular day?
5. Now, describe your food and eating behaviors on an irregular day, weekends, off days, sick days etc.
6. Please explain how your everyday life affects how you choose your food.
7. Please discuss the current availability of healthy food choices in your immediate living area (off-campus, on-campus, commuter, etc) to include the dining hall, vending machines, and food establishments.
8. If you could make one change to the food availability on campus, what would it be and why?
9. Please explain what impact your family has on your food choice and eating behavior?
10. What were the biggest reasons why your family chose the food they ate?
11. When it comes to regular food choices, have you changed your eating behaviors due to the environment i.e. the collegiate sports environment and why?
12. Where do you buy most of your food and why?
13. Where do you eat most of your food and why?
14. What foods do you choose that help achieve your health (or fitness) goals and why?
15. How do you ensure that your food choices align with your personal beliefs? Please explain how you're eating behavior reflects your personal beliefs.
16. Please describe the traits/characteristics of the foods you frequently choose, for instance, crunchy, salty, sugary etc. How often do you choose these foods and why?
17. Why do you think you prefer to choose certain foods over others?
18. Please explain the variation in food choice during a sports season. Why is your food choice different in-season versus offseason?
19. Please explain the impact on your food choices from either your coaches or teammates.
20. Why do you choose certain foods for sports related activities or training?

Appendix F: Coach and Athletic Trainer Toolkit

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Figure 1: Coach and Athletic Trainer Toolkit