HEALTH BEHAVIORS

IN ATHLETIC TRAINERS

By

EMILY MADRAK

Bachelor of Science in Athletic Training
Lock Haven University
Lock Haven, PA
2012

Master of Science in Exercise Science
California University of Pennsylvania
California, PA
2013

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
May 2021

HEALTH BEHAVIORS

IN ATHLETIC TRAINERS

Dissertation Approved:

Jennifer L. Volberding, PhD, LAT, ATC

Dissertation Adviser

Bridget M. Miller, PhD

Ki L. Cole, PhD

Kathleen S. Curtis, PhD

ACKNOWLEDGEMENTS

This dissertation is dedicated to the late Kim Dymond, my high school physics and anatomy teacher. You instilled a love for science in me that I will never forget. Rest easy.

To my parents- You always told me I would go to college, and I never doubted that. I also never realized that it meant 9 years of college… Thank you for always believing in me and supporting my dreams. I never would be where I am today without your sacrifice.

To Jen- Thank you for your guidance, candor, encouragement, tough love, and friendship. I couldn't have asked for a better advisor, boss, mentor, and friend. You made this experience absolutely phenomenal.

To Dr. Miller, Dr. Curtis, and Dr. Cole- You all have helped me grow and flourish beyond the research. Thank you for your constant guidance and sticking with me through this 100+ page beast.

To LHU Athletic Training Program Faculty- You were the start to my life in athletic training. I wouldn't be here without you!

To Misty- My favorite co-worker, fellow gossip, and one of the best boss's I've ever had. Thank you for your laugher, shoulder to cry on, flexibility, and resilience.

To Matt, Aric, Steve, and TJ- Each one of helped make my Oklahoma experience whole. I appreciate everything you have taught me from training standardized patients, pedagogy, book club, and deadly nighshades.

To Jeff, Robyn, and Derek – Seeing you all be successful in your fields has been a constant carrot for me. Knowing that you all "made it" helps me push through each day.

To my friends, new and old –No matter the time or distance, I am so grateful you have stuck by my side, listened to me drone on about research, and always continued to encourage me to keep going. I could not have gotten through this journey, let alone 2020, without you.

And lastly,
To my "regulars" at Ol' Vine – From your first time in, to now, I deeply appreciate the friendship I have built with you over the past 4 years. You have become my biggest cheerleaders. I will deeply miss our weekly chats, discoveries, and welcomed company.

Name: EMILY MADRAK

Date of Degree: MAY 2021

Title of Study: HEALTH BEHAVIORS IN ATHLETIC TRAINERS

Major Field: HEALTH, LEISURE, AND HUMAN PERFORMANCE

Abstract:

Introduction: Athletic trainers (ATs) are healthcare professionals that care for the physically active. Because of this, it is estimated that ATs are healthy. Numerous research studies have demonstrated the benefit of health role-modeling and the beneficial effects it has on patients, but currently there is not data relating to ATs. This research explores the health behaviors that ATs demonstrate and what it means for patients. **Methods:** A pilot study was first used to determine reliability. Following the pilot, a quantitative study was conducted through a self-report survey sent to a specific pool of members in the National Athletic Trainers Association (NATA). It measured body measurement index (BMI), physical activity (PA), diet, weight-loss dieting behavior, disordered eating behavior, and work ability. **Participants**: 265 ATs (main study) met inclusion criteria for participation. **Analysis:** Data was analyzed based on research question. The first asked differences between BMI, PA, and nutrition by gender, years certified, setting, and region. Analyses of variance were used to determine differences. The second used chi square test to determine differences in dieting behavior between the same demographics in research question one, and then if disordered eating patterns related with that dieting behavior. The third used ordinal regression to predict differences in work ability (physical and mental), through BMI, gender, years certified, region, and type of work. **Results:** Question one demonstrated significance with gender and BMI, and light PA and setting. Females had a lower BMI than males, but no differences were observed with setting due to low power. The second question also demonstrated significance with: “Have you dieted?” and females, “how long have you kept the weight off?” and greater than 20 years certified, “are you currently on a diet?” and a greater disordered eating score, “have you ever dieted?” and a greater disordered eating score, and “how long did you keep the weight off?” and a greater disordered eating score. **Conclusion:** Though ATs may work with a physically active population, they appear to be “cutting corners” when it comes to their own health. This may reflect poorly on patient adherence and health due to poor health role-modeling.

TABLE OF CONTENTS

Chapter Page

Chapter Page

LIST OF TABLES

Table Page

LIST OF FIGURES

Figure Page

CHAPTER I

INTRODUCTION

In this current day and age, a person cannot escape any kind of periodical without reading about health, fitness, nutrition, and/or diet. It seems that every month a new miraculous discovery will prevent certain disease, promise significant weight loss, or change health trends as we know it. However, it is often difficult to decipher what is fact, fiction, and necessity. This constant feed of health information is oversaturated, leading to an influx of health-conscious individuals, and often leaving them confused as to what direction to go in. Careers in healthcare have grown considerably due to the increasing desire to improve health, cure the previously incurable, and ward off death as long as possible. Traditional healthcare positions such as a physician and nurses are often the first providers an individual consults with, regarding their health. However, more specialized healthcare professions are on the rise, such as athletic trainers, who provide a multitude of specialized healthcare skillsto the physically active and others (Weidner & Henning, 2002). But what is health, exactly? The definition may be different for each individual person.

Health was originally defined in 1946 by the World Health Organization (WHO) as the “state of complete physical, mental, and social well-being” or the absence of

disease or other pathology (WHO, 2014). This definition remains the same in the WHO's most current constitution and is used by various other health organizations (WHO, 2014). Although not as publicized, Sartiorius (2006) adds that health is the ability to cope with demands of daily life, and that it is the state of equilibrium that one has established within and between them self in the social and physical environment. The World Health Organization believes that a fundamental right of every human being is to attain the highest standard of health (WHO, 2014). However, the WHO's definition reveals tones of perfectionism and absolutism. Essentially, it appears that each person needs to be absolutely perfect in each degree of health, as if health exists in a vacuum. In an editorial based upon Georges Canguilhem's book, *The Normal and the Pathological* (1943), the author defines health as the ability to adapt to one's environment, which varies for each person (The lancet, 2009; Canguilem, 1943). Canguilehm's (1943) definition allows for more than just the individual (animate environment), it includes the inanimate environment in multiple dimensions, looking at society, the molecular level, and various genomes. Canguilhem (1943) further concludes that using the definition of health as a vision of adaptability, rather than perfection can lead to greater advances, compassion, and creativity in modern medicine. Although Canguilhem's definition and theory of health provides a deeper understanding, many individuals still struggle with adapting to their environment and/or even finding a fair state of the WHO's principles of health. It will explore the reasoning behind the definition of health and how it has evolved to fit the present. The upcoming section will also detail the many facets of healthcare as a profession, and the specific niche of sports medicine and how it contributes to health in society.

General Health

Epidemiological History of Health

In the present day, most humans die of chronic illness often related to sustained unhealthy behaviors, rather than infection, which often took lives before their 30th year of life in pre-modern era. For example, conditions such as tuberculosis, typhoid fever, measles, and dysentery were among the many causes of death in the early 1900's (Dept. of Commerce and Labor, 1910). Many of these have since gone almost extinct due to modern medicine involving preventative care, proper sterilization, and the invention of vaccines. The infant mortality rate, which is regarded as a "good indicator" of overall health, has decreased in the United States, to about 6 deaths per every 1,000 births, as compared to the early 1900's with 100 deaths per every 1,000 deaths (CIA, 2020; CDC, 1999). However, the United States still has ways to go with overall health improvement. Monaco has the lowest infant mortality rate, (about 2 deaths per every 1,000 births), but the US prevails when compared to countries with low human development such as Afghanistan, with the highest rate of about 110 deaths per every 1,000 births (CIA, 2020). In a more even comparison of countries with high human development, China, who ranks just below the United States (The United States and Canada tie at 10, China is at 12), ranks much higher in infant mortality rates (12 deaths for every 1,000 births) (CIA, 2020, Human Development Index, 2016). This gives a great example of how even highly developed countries can still falter.

Although death by infection has significantly decreased since the 1800s, death by disease has taken its place. Currently, the US has a life expectancy average of 78.6 years (NCHS Data Brief, 2020). However, as of 2017, heart disease is the number one killer in the

United States, which can alter that life expectancy average (NCHS Data Brief, 2020). This type of mortality [disease] is usually a "slow death" due to its chronic nature, in comparison to infectious deaths which usually have a rapid, acute onset. The improvement of mortality rates and transition of death by infection to death by disease is due to numerous technological advances, and most importantly epidemiology. Epidemiology is defined as the "study of the distribution and determinants of health" (CDC, 2012). Hippocrates was the first to subscribe to this philosophy in 400 BC, however, it wasn't until the 19th century when the study of the spread of disease was appreciated, executed, and applied to public health (CDC, 2012). Researchers began to take note of symptoms and signs of disease and where it occurred. This information, rather than a name or exact cause, was utilized to influence public health policy. The study of epidemiology influenced the public health standards we know today by providing the statistics and data needed to properly inform policy which theoretically keeps us healthier (CDC, 2012).

Although there have been numerous public health advances since the 1800's, improving quality of life and prolonging it, the United States is far from being one of the healthiest nations (NRCIM, 2013). In a comparison of the highest human developed nations, Norway takes first place, with the United States tying Canada at tenth place (HDI, 2017). This could be attributed to low infant mortality rate (2.5 deaths per 1,000 births), life expectancy (81.7 Norway, versus 79.2 United States), gross national income (67,614 Norway versus 53,245, and years of schooling (17.7 Norway versus 16.5 United States) (CIA, 2020; HDI, 2017). These differences in Norway are mostly attributed to an economy that values equality in living and decreasing the disparity between high and low wage jobs. In

comparison, the United States has become one of the most economically unequal of highly developed nations (HDI, 2017).

Epidemiology has allowed us to determine where poor health exists. As eluded to above, an inequality exists in the wealth of the United States. This inequality can leave many without health insurance and create further health disparities. Those that are uninsured may often be associated with low socioeconomic status (SES); however, it should be noted that lack of insurance it is not limited to just that demographic. Nonetheless, The National Research Council and Institute of Medicine (NRCIM) (2013) cites that because of a lack of insurance and low SES, Americans are not often able to afford quality healthcare outside of hospitals. Although the relationship between healthcare disparities and low SES is prominent, advantaged Americans still fare worse than equivalent countries such as England (NRCIM, 2013).

Wealth plays a large role in an individual's health and well-being, but individual health behaviors can contribute significantly more in regard to quality of health (NRCIM, 2013). This can include the lack of physical fitness, improper diet, and irregular wellness exams. Interest in nutrition and dieting for weight-loss has inflated significantly and this is often due to social media and celebrity endorsement of weight-loss diets and diet-related products. One overly inflated example is The *Ketogenic Diet.* The "keto" diet, as many call it, has become extremely popular due to its promise of miraculous, rapid, weight-loss (Evans, 2018). Those trying to lose weight may consider this option due to its speed and enticing high-fat foods, but long-term effects and cardiovascular risk raise significant concern in the medical community (Evans, 2018). Patients are often unaware of the side effects and long-term effects and try such-diets or other weight-loss products without proper advisement. The

same can be said with other aspects of health; people are lacking the knowledge and education in healthy choices and lifestyle options. In addition to the example of the keto diet, many Americans do not eat sufficient amounts of fruits and vegetables and overeat high-fat and processed foods, which continues to feed in the vicious cycle of obesity and diet-culture. Furthermore, those with the access to healthcare may not utilize it properly or know which questions to ask. In order to create a healthier society, we first need to understand the baseline status of health and health behaviors, and what needs to be done to maintain it. This is called health literacy and it will be explored in the next section.

Baseline Health

Many do not have a great understanding of the facets of health, or health literacy. They may not have the education, knowledge, or the means of speaking with a qualified individual. Due to this, when an individual is concerned about health, wellness, and well-being, they may first complete a search on the internet. This can lead to an influx of information. More often than not, this information is not tailored to the individual's needs and can result in misinformation and unhealthy practices. Ideally, an individual should consult with their primary-care physician (PCP) when seeking any sort health guidance or lifestyle change as PCPs are theoretically the most trusted source of health for the patient (Oberg and Frank 2009). PCPs often provide a baseline for overall health and health information for the general population. This can include biomarkers for blood pressure, cholesterol, weight, stress, mental health, reproductive health, and digestive health. The broad knowledge that PCP's possess of general health and where each age bracket and gender should fit, is often the minimum standard to keep most people at a baseline standard of health. With the information provided by a PCP, patients are more likely to adopt a

healthier lifestyle due to a physician recommendation (Oberg and Frank, 2009). However, as much as a physician may assist in this process, it requires patient adherence and cooperation in order for health to improve and/or remain at a baseline.

Health Role-Modeling

In theory, a PCP should be "healthy," as their job is to promote and assist in patient health. Health counseling is a large part of the PCP's role, and it been proven to be more effective than self-proclaimed specialists or "health coaches" who may lack certain qualifications (Oberg and Frank, 2009). The PCP's effectiveness goes back to them being the most trusted source of health information (Oberg and Frank, 2009). However, not all physicians were developed equally, nor are their own personal health habits a reflection of public health recommendations. For example, if a physician smokes tobacco and then tries to counsel a patient on the benefits of smoking cessation, the likelihood of the patient committing to a smoking cessation program becomes significantly decreased due to the lack of adherence from the physician (Oberg and Frank, 2009). The patient may have thoughts of, "if they can't do it, how can I?" (Russell, 2012).

In terms of physician development, medical school is often the first place (after upbringing) that shapes a physician's health behaviors. Numerous studies have indicated that the greatest wealth of knowledge in healthy lifestyle and dietary habits is with medical students, when compared to other [higher-education] students (Akhtar, Zareen, and Saarmad, 2018). However, just because they may be the experts in the area, it does not mean it is translated into practice. Colic Baric, et al. (2003) discovered that a significant number of medical students reported inadequate activity levels, malnourishment, high stress, and an

unhealthy diet while in medical school. Another study indicates a high level of "junk" food was observed in 97% of students' diets (Nisar et al, 2008). These unhealthy behaviors could be attributed to the amount of stress medical students experience (Kotter, Tautphaus, Obst, Voltmer, and Schere, 2016; Iorga, Dondas, and Zugun-Eloae, 2018). Theoretically, by addressing the mental and physical health of medical students, some of these unhealthy behaviors may be resolved. Society expects healthcare providers to be models of health, but these studies suggest otherwise, and steps need to be taken for physicians to have a healthier lifestyle at their initial inception, in medical school.

Despite the alarming medical student health disparities, previous research has demonstrated that one of the strongest predictors in health counseling and patient adherence is when a physician practices the behaviors they speak of and essentially serving as a role model for the patient (Oberg and Frank, 2009). This includes creating steps and specific instructions to decrease a disparity rather than a broad objective of weight loss, or drug therapy (Oberg and Frank, 2009). A lack of explanation often contributes to the lack of adaptation from the patient (Oberg and Frank, 2009). Further research describes "healthcare workers" (no positions were specified), are more likely to have a PCP and engage in healthy behaviors (i.e. less binge drinking) than the general population (Helfand and Mukamal, 2013). Research on physical education educators demonstrates similar results, indicating high levels of activity and influencing physical activity in pupils (Zhu, Haegele, and Davis, 2018). Oberg and Frank (2009) identified multiple healthy behaviors that PCPs partake in, including increasing physical activity, decreasing substance use, use of preventative screenings and products, and decreasing dietary fat intake. Due to the role-model development of the physician, patients often view the physician as more credible and motivating (Oberg and

Frank, 2009). This therefore increases the patient's ability to become more receptive to health information and counseling, and the ability to implement the healthy behaviors (Oberg and Frank, 2009).

The Patient Promise

There has been significant progress in the way healthcare providers demonstrate healthy role-modeling. In 2012, two Johns Hopkins medical students, Shiv Gaglani and David Gatz, took a course on obesity and observed doctor-patient interactions in clinics. Through their research and clinical interactions, they found ample evidence that the way a healthcare provider looks, feels, and behaves greatly can greatly influence the patient (Russell, 2012). Gaglani went on to state that the challenges of healthcare providers (stress, workload, inactivity) can often obstruct these healthy behaviors (Russell, 2012). As a result, Gaglani and Gatz developed "The Patient Promise", which is an oath, similar to the Hippocratic Oath, in which healthcare providers can promise to lead by example and practice the behaviors they instruct to their patients (Russell, 2012).

The *Patient Promise* involves a substantial checklist. It involves the promise to: adhere to regular physical activity, balanced and nutritious diet, refraining from the use of harmful substance, decreasing stress and managing mental health, encouragement of patients to adopt the same habits and working alongside of them, seeking to understand the traditions and habits of the patient, identification and guarding of prejudices based upon own unhealthy behaviors, and community healthy lifestyle promotion (Russell, 2012). A key component is the tenet that guards against prejudice and recognizing biases. Gagliani stated that patients who engage in unhealthy behaviors, or have a physically unhealthy appearance, often feel

stigmatized by their healthcare provider (Russell, 2012). This stigmatizing and stereotyping by the healthcare provider can lessen the patient's chances of seeking assistance (Rienzi, 2012). Gagliani further states that this bias needs to be acknowledged and best practices would ensure that healthcare providers are aware of these stigmas (Russell, 2012). This is essential as over 30% of Americans are categorized as obese (CDC, 2018, Russell, 2012). This key piece assists in keeping physicians grounded when counseling sensitive topics, such as weight or substance abuse, with patients. The notion behind all of the research regarding *The Patient Promise* is to assist in reducing obesity levels, heart disease, cancer, and encourage preventative behaviors. It is an innovative intervention to encourage healthy or healthier behaviors in the general population. Conclusively, this initiative gained thousands of signatures from various healthcare providers across the nation in hope of a healthier future. However, empirical evidence was not gathered on the impact and effectiveness of *The Patient Promise* on patient health behaviors

Healthcare for the Physically Active

With physical inactivity contributing to the ten leading causes of death in developed countries and directly related to obesity, complications with heart disease and chronic obstructive pulmonary disease (COPD), physicians are prescribing exercise to combat increased morbidity and mortality (WHO, 2019; Lambert, 2019). In London, contributors state that physical activity can significantly reduce the National Health Service (NHS) budget, while having the effect, if sustained, of adding years to the lifespan (Lambert, 2019). Additionally, PCPs have stated that medications will not be beneficial if lifestyle issues are not reformed for the better (Lambert, 2019). Furthermore, in the United States, the American College of Sports Medicine (ACSM), began a campaign called "Exercise is Medicine"

urging PCPs to review each patient's physical activity at each visit, as well as encourage it in the inactive (Morrow Jr., De Fina, Leonard, Trudelle-Jackson, Custodio, 2012). The idea is to make physical activity and exercise a part of medical treatment and disease prevention (Morrow Jr. et al., 2012).

However, with increased physical activity and exercise, particularly in those who are just starting out or lacking proper conditioning, the risk of musculoskeletal injury (MSI) increases (Cai et al., 2018; Morrow Jr. et al., 2012). When it comes to MSIs, referral to an orthopedic specialist will yield greater accuracy of diagnosis and care than with a PCP (Gereats, van Meer, and Bierma-Zeinstra, 2013). Orthopedic specialists, such as sports medicine specialized physicians (SMSP), and athletic trainers (ATs) are experts in prevention, treatment, and rehabilitation in MSIs typically found under the umbrella of sports medicine (Prentice, 2017). Sports medicine is an umbrella term that encompasses multiple facets of physical activity and sport (Prentice, 2017). It has become a rising specialization to meet the increased training and physical activity needs (Menzies and Young, 2011).

The History of Sports Medicine

The original inception of sports medicine began in the early 1900's in Germany, with a lab devoted to sports and fitness (IFSM, 2020). By 1915, the German physician, Arthur Mallwitz, became the very first "Sports-Physician" (IFSM, 2020). The International Federation of Sports Medicine (FIMS, its accepted abbreviation), the first organization devoted to sports medicine was formed in 1928, with its initial inception shortly after the first ever Olympic Games (IFSM, 2020). World War I put sports medicine development on hold, with little progress occurring until after World War II (IFSM, 2020). In the 1950's, FIMS

founded a chapter within the United States, which eventually became the American College of Sports Medicine, as we know it today (IFSM, 2020, ACSM, 2020). Since then, the ACSM developed the official definition of sports medicine that includes a multidisciplinary approach to sport and exercise through the examination of physiological, biomechanical, psychological, and pathological phenomena occurring with such activities (Prentice, 2017).

Sports Medicine Specialists

Athletic Training, an integral member of any comprehensive sports medicine team, is a specialization within sports medicine which focuses on prevention, treatment, rehabilitation, evaluation, and diagnosis of acute, chronic, and emergent musculoskeletal injuries and other medical conditions (Prentice, 2017). ATs are usually the first to evaluate an MSI and see it through from inflammation, to healing, to return-to-play on a daily basis; unlike the SMSP which usually only intervenes at initial injury. ATs deliver quality healthcare through five domains of clinical practice: injury/illness prevention and wellness protection, clinical evaluation and diagnosis, immediate and emergency care, treatment and rehabilitation, organizational and professional health and well-being (NATA, 2010). These are vital to an athletic trainer's practice. Athletic Training was first recognized as an allied healthcare profession in 1990 (Weidner & Henning, 2002). Currently, a professional master's degree in athletic training from a Commission on Accreditation of Athletic Training Education (CAATE) program, along with passing a national certification exam is needed in order to obtain certification and begin practicing (Prentice, 2017; CAATE, 2020). Additionally, ATs need to work under the direction of a physician, usually a sports medicine specialized physician (SMSP), and follow the practical and ethical laws of their state-practice act (Prentice, 2017).

Ideally, a sports medicine "team" is formed when working with athletic patients that includes the athletic trainer, SMSP, dentist, registered dietician, sport and exercise psychologist, orthopedic surgeon, etc. in order for the athlete to perform at optimal condition (Prentice, 2017). The AT is usually the first line of defense in the sports medicine team to prevent and treat MSI and non-orthopedic conditions (NATA, 2010). The other entities on the sports medicine team are only utilized when the care moves outside of the AT's scope of practice, or additional consult (second opinion) is need. Additionally, a SMSP may only be present for competitions that have a high-risk for injury.

Although the SMSP or other entities are not always present, they are certainly utilized frequently. For example, although athletic trainers can suggest a radiograph (X-ray) or magnetic resonance image (MRI), they cannot prescribe it and must refer out to appropriate authority (usually SMSP) (Prentice, 2017). Furthermore, PCPs may be sought out to prescribe medication for an infection. This can all be easily accomplished with electronic medical recording systems that allow inter-professional communication while keeping health information confidential. Additionally, the practice acts for athletic trainers have been changing, allowing the AT to use more advanced tools, such us dry needling and intravenous saline drips in certain states (Unverzagt, Verglundt, and Thomas, 2015; Velasquez, 2018). These new tools have contributed to the dramatic evolvement of the AT profession over the years, since its initial inception in the 1950's (Prentice, 2017).

Traditional Athletic Training

Traditional athletic training focuses almost exclusively in caring for the athletic population in high schools, colleges, and professional settings (Prentice, 2017). It entails pre

and post-practice procedures involving injury prevention techniques such as stretching, taping, educating, and ensure general medical health is at baseline (Prentice, 2017). They are equipped to triage and/or treat a variety of orthopedic injuries and general medical conditions from an ankle sprain, to sinus infection, to eating disorders (Prentice, 2017). In addition to knowledge and skill, most job responsibilities require set-up of water, ice, and medical supplies. The athletic trainer needs to be strong enough to lift a 10-gallon water cooler, stand without rest for a minimum of 2 hours, and have the ability to sprint onto the field-of-play the instant an athlete is injured (Prentice, 2017). The greater the level of sport, the greater demand for the athletic trainer (Prentice, 2017). This often results in days lasting longer than the "normal" eight hours, early rising, travel, odd eating habits and hours, and lack of time-off and vacation. Because of this, the athletic trainer in a traditional setting ideally needs to remain in good health and physical fitness (Cuppett and Latin, 2002).

Changes in Athletic Training

Although many ATs work in the traditional setting, the occupational and industrial setting is employing more ATs each year. Currently, numerous ATs work in hospital clinics, industrial and occupational settings, performing arts, military, and governmental agencies, which broadens the profession, provides healthcare to more than just the athletic population, and conclusively allows the profession to align more closely with other healthcare professions (Prentice, 2017). These settings often offer a more normalized work schedule, with no-more than 40 hours per-week, time off during the weekends, and little-to-no travel. Because of these benefits, the non-traditional settings can often bode well for better quality-of-life.

In addition to quality-of-life, the rise of the non-traditional athletic trainer has been highlighted in recent studies (Halls, 2009; Shanley et al., 2019). Halls (2009) research on return-on-investment (ROI) exemplifies how athletic trainers in occupational settings have used prevention and ergonomic programs, education, fitness and nutrition, rehabilitative services, and first aid to significantly decreased insurance claims, time-out of work, worker's compensation, and general healthcare costs. Furthermore, Shanley et al., (2019) demonstrates the need for preventive care, how valuable an AT is in reducing cost, and allows better access to healthcare. Additionally, the effectiveness of ATs has been evaluated and it has been determined that ATs and physicians are in agreement with diagnosis 92% of time (Lombardi, et al., 2016). Essentially, these studies conclude that employing an athletic trainer in the occupational environment or by consulting one at a clinic, can prevent the need for physician involvement, which therefore significantly reduces the rising cost of healthcare.

The profession of athletic training is receiving more recognition each year. It is reaching more than athletics to provide healthcare for those in roles that require a level of strength, physicality, endurance, or movement in general (Prentice, 2017). Under Domain I, injury and illness prevention and wellness protection, ATs possess skills for assessment of cardiovascular health, body composition, strength and endurance, weather and hydration acclimatization, nutritional advisement, dietary substances, substance abuse, emergent situations, and facility safety (NATA, 2010). As the AT is a healthcare professional, it is essential for patient compliance, adherence, and cooperation for the AT to remain in good health and practice the health-components they advise to their patients, as previous research has demonstrated with primary-care physicians (Oberg and Frank, 2009). The same goes for all professionals on the sports medicine team.

Although the idea of a physically healthy AT seems as though it would be an obvious baseline, there is minimal documented research on the physical health in ATs (Stanek, Rogers, and Anderson, 2015). With the rise in performance and skill in athletes and the increase of athletic trainers in occupation and industrial settings, it is essential for ATs to exhibit current knowledge and best practices in healthcare and to be better role models for increased patient compliance as their reach grows into a larger population each year.

Purpose Statement

This study seeks to understand levels of health behaviors in athletic trainers. Though health behaviors can have a multitude of definitions and interpretations, it will be operationalized for this study as actions that affect health and well-being of individuals and populations based on experiences and circumstances that have been ingrained over time in each individual through social, economic, biological, mental, and physical contexts (Short and Mollborn, 2015). With heart disease being the number one killer in the United States, obesity affecting 30% of the population, and increasing levels of prescribed exercise, it is important for those that assist the physically active, to essentially "practice what they preach" in terms of physical activity, nutrition, and other health behaviors (CDC, 2019). Time constraints, stress, and quality-of-life play a large role in terms of proper health for the AT (Gibson, Cohen, Boyce, Houston, Welch, and Bacon, 2016). Due to the lack of research in this specific area, a quantitative approach was taken to assess the current variables: current eating and feeding habits, body mass, disordered eating patterns, physical activity levels in ATs, and work ability.

Demographic information includes gender, age, years since certified, occupational setting, region of residence, height, and weight. The overall study contains many components. The first was to identify average levels of selected variables in ATs. Second was to compare the statistics to the recommended normal standards set forth by the WHO and ACSM to determine if ATs are practicing proper role-modeling behaviors. Third was to identify unhealthy behaviors in the profession and their influence on working ability.

Research Questions

This study was guided by the following questions:

1. Is there a difference in BMI, PA, and nutrition by gender, years certified, setting, and by region?
2. Is there a difference in dieting behavior between by gender, years certified, setting, and by region? Do disordered eating patterns relate with this behavior?
3. Is there a difference in working ability, predicted through BMI, by gender, years certified, setting, region, and type of work?

CHAPTER II

REVIEW OF LITERATURE

Research and development have done a great deal to progress healthcare and health behaviors since the 1800s. Chapter one discussed health's epidemiological history, and how it significantly impacted our current health behaviors and public health policy. As research and public health workers took note of disease and its signs and symptoms, policies, procedures, protocols, and new medical technologies were developed in order to create a better picture of health and wellness (CDC, 2012). Chapter 1 also discussed the impact of health role-modeling and how it can contribute to great patient adherence and cooperation with their provider, specifically with *The Patient Promise*. *The Patient Promise* was an initiative for physicians and other healthcare providers to essentially practice what they preach in terms of health. It listed several items in which the provider "promised" to uphold, similar to the Hippocratic oath. It did have moderate success; however, no empirical evidence was collected.

Chapter 1 also discussed specific healthcare professions, sports medicine professionals such as athletic trainers (ATs). It discussed how their role in health fits a niche population, the physically active. It could be hypothesized that since these sports medicine professionals work with the physical active, a reverse health role-modeling

effect would be present: the provider is more likely to be physically healthy due to the population they work with. Although this is good in theory, with this, the present study seeks to evaluate the average levels of physical health observed in ATs..

Chapter two will discuss the variables of health behaviors in ATs. As stated in chapter 1, health behaviors will be defined as actions that affect health and well-being of individuals and populations based on experiences and circumstances that have been ingrained over time in each individual through social, economic, biological, mental, and physical contexts (Short and Mollborn, 2015). This exploration of these health behaviors includes body mass, effects of obesity, disordered eating, eating habits and frequency, physical activity, and work ability in relation to level of obesity. With the investigation of these variables brings the second and third questions of research: 2. Is there a difference in dieting behavior between by gender, years certified, setting and by region? Do disordered eating patterns relate with this behavior? 3. Is there a difference in working ability, predicted through BMI, by gender, years certified, setting, region, and type of work? The variables: eating habits and frequency will include an exploration into nutrition patterns, dieting history, current trends, and best practice for these behaviors. Work ability will be explored in the effects of obesity section in order to create a thorough foundation for data analysis and discussion. Ideally, this research will serve to benefit ATs as they can personally discern where better health behaviors may need to be implemented. As a result of this implementation, it can lead to greater patient adherence and cooperation, as studied in primary care physicians, nurses, and medical students (Oberg, Frank, 2009).

Body Mass and Weight

The first factor of physical health this research will investigate is body mass. Body mass is the amount of matter (such as adipose tissue (fat), muscle, bone, organ tissue, etc.) an individual has and is separate than the weight that one sees on a scale. Rather, weight is the resultant of mass multiplied by gravitational force (9.8 N/kg). The greater the mass, the greater the gravitation pull of the Earth, resulting in increased weight. Though it is ideal for the general population and healthcare providers role-modeling healthy behaviors to maintain a healthy weight and have a small amount of adipose tissue, many factors can influence these variables. Innate factors involve genetics, gender, age, or developmental and lack voluntary control (Institute of Medicine, 2004). Behavioral factors such as activity level, stress, medication, and diet can significantly impact weight and adipose tissue mass as well, but unlike the innate factors, can potentially be altered (Institute of Medicine, 2004). Additionally, any of these behavioral factors can cause fluctuations in weight.

The condition of being overweight is specified as when one weights more than one should via given proportions (CDC, 2020). The weight can involve muscle, bone, fat and/or water in body. Underweight is classified as weighing less than one should for their given proportions and will be discussed in the disordered eating section (CDC, 2020). Obesity is characterized by being overweight with excessive adipose tissue. These factions are determined and classified by using the *Body Mass Index* measurement tool. In the United States, 2 out of 3 adults are considered overweight or have obesity, with 1 in 6 children (9-16 years old) classified as obese (Fryar, Carroll, Ogden, 2016). These trends have steadily rose since the 1960s (Fryar, Carroll, Ogden, 2016). In an effort to

better understand these trends and how they are measured, we will explore the facets of the *Body Mass Index* in the next section.

Body Mass Index

Body Mass Index (BMI) is the most common and easiest objective form of measurement for determining obesity levels. It defines anthropometric height/weight in adults, which, in turn, classifies them into groups of weight-related health (CDC, 2020). BMI is equal to body weight (kilograms) divided by height squared (meters). It was originally developed in 1832 by Belgian mathematician, Adolphe Quetelet, and was originally entitled the *Quetelet Index* (Garabed, 2008). In 1972 the title was changed to the *Body Mass Index* by American physiologist Ancel Keys (Garabed, 2008). Keys was a pioneer in cardiovascular health, investigating how diet influences fat and cholesterol levels (Mancini and Stamler, 2004). The index states that for anyone less than a BMI of 18.5, they are considered underweight; 18.5 to 24.9 is normal (optimal) weight, overweight is 25 to 29.9, and obese is defined by having a BMI of 30 or greater (USDHHS, 2015).

Although BMI is an inexpensive and objective avenue of determining obesity status, it has been considered a poor indicator of body fat due to its lack of differentiation between body fat and muscle mass (Nuttall, 2015; Goacher, Lambert, and Mofffatt, 2012). Weight/height tables similar to BMI were initially used by life insurance companies to predict life expectancy from the 1970s to 1990s (Nutall, 2015). The tables had established norms and if an individual was 20% above or below the mean for the height category, they would be considered overweight or underweight, respectively, and this could impact the level of insurance coverage (Nutall, 2015). This method was highly

criticized, and validation was skeptical (Nutall, 2015). Criticism mostly occurred because the height and weight tables did not take leg and trunk length into account, and only classified people into small, medium, or large in frame size (Nutall, 2015). BMI is often still equated with the height/weight tables as a tool only used by insurance companies [to determine life expectancy], rather than a valid measurement of health. It therefore has a fractured reputation. However, Keys suggested using BMI as better indicator of body mass during the 70s, as it reduced the effect of a variance in height in the height and weight relationship (Nuttall, 2015). Despite this, BMI took a while to become accepted by health professionals.

Although this appeared to be a better method, Keys also suggested that BMI poorly represented body fat percentage (Nutall, 2015). Other methods such as body fat percentage using skin fold calipers, densitometry, bioelectrical impedance, and the dual energy x-ray absorptiometry (DXA) prove to be more accurate in body fat measurement, but often require financial investment and require a patient and clinician's time to complete. Although there are flaws in using BMI to determine obesity, it is still widely used. The Center for Disease Control (CDC) and World Health Organization (WHO) continue to make it the standard, as it provides the best ease of access and efficiency for use in large populations (CDC, 2020; WHO. 2020). However, both organizations note its efficacy in direct measurement of body fat and that it should be used as a screening tool rather than direct indicator of health status (CDC, 2020; WHO, 2020). Additionally, the National Athletic Trainers' Association (NATA) position statement on safe weight loss and maintenance in athletes suggests BMI is a better measurement tool for the general population, rather than in athletic populations due to the athletic body having a different

tissue composition than the general public (Sammarone Turocy et al., 2011). Despite its lack of differentiation, BMI demonstrates moderate correlation with more direct measures of body fat [skin fold calipers, bioelectrical impedance, densitometry, DXA] (Garrow, 1985; Freedman, Horlick, and Berenson, 2013; Wohlfahrt-veje et al., 2014). It also strongly correlated with adverse health statuses that are consistent with direct measures of body fat (Steinberger et al, 2005; Sun et a., 2010; Lawlor et a., 2010; Flegal and Graubard, 2009; Freedman et al., 2009; Willett et al., 2006). The greater the amount of body fat, the greater chance a person has developing comorbidities associated with obesity. This can significantly impact the physical health of anyone including ATs and SMSPs as no one is immune to the effects of it. Impacts of obesity will be discussed in the next section.

Overweight and Obesity

Obesity is a serious medical condition, with over 30% of the United States population affected by it and the physical, economic, and psychological impacts associated with it (Kyle et al., 2017). Physically, it increases the risk for serious diseases and conditions such as: type 2 diabetes, heart disease, stroke, sleep apnea, hypertension, various cancers, osteoarthritis, and difficulty with physical function (CDC, 2020). The most common condition among obese patients is type 2 diabetes, with 8 in 10 adults in the United States affected (CDC, 2020). This is mainly due to improper diet and exercise (CDC, 2020). Type 2 diabetes is often the underlying cause for all co-morbid disorders associated with overweight/obesity (CDC, 2020). The increased blood glucose levels that occur with type 2 diabetes lead to heart disease, stroke, kidney disease, and associated neurological and eye problems of diabetes (CDC, 2020).

In addition to diabetes, the increase of adipose tissue causes strain on the blood vessels, creating greater systolic and/or diastolic pressure, leading to hypertension (CDC, 2020). Furthermore, increased adipose tissue causes more strain and pressure on the joints, often rendering immobility, leading to osteoarthritis and other associated orthopedic complications (CDC, 2020). During pregnancy, the extra mass on the body, as well as co-morbid factors such as hypertension, put the child and mother in danger of birth complications and/or death (CDC, 2020). All of these factors lead to significantly decreased life span, in comparison to a normal weight individual (Kudel, Huang, and Ganguly, 2018).

Economic Burden of Obesity

Economically, those who are obese incur almost half of all inpatient costs, 46% more than normal-weight individuals, seek physician assistance almost one third more than normal-weight (27%), and spend 80% more on prescription medication (Jensen, 2013). This has cost the United Stated approximately $147 billion in healthcare costs (Jensen, 2013). Additionally, it can affect work productivity, which has a direct impact on cost, specifically in jobs requiring physical workloads involving repetitive motions and awkward body positioning (Kudel et al., 2018). Researchers established that obese individuals could incur a 5% loss in productivity level due to needing extra time to complete tasks that are physically demanding (Gates, Succop, Brehm, Gillespie, and Sommers, 2008). Furthermore, obese individuals in comparison to normal weight will have greater absenteeism from work, and less likely to be employed overtime resulting in substantial economic burdens (Kudel et all, 2008).

Psychological Precursors and Impacts of Overweight and Obesity

A clause in the *Patient Promise* indicates that healthcare professionals will not stigmatize and guard themselves from potential prejudices of unhealthy behaviors. Although this is ideal in theory, many individuals are still stigmatized, especially those that are overweight and/or obese (Collins and Bentz, 2009; Puhl and Heuer, 2010). Society has a negative view of obese individuals, thinking of them as lesser humans, weak, and/or unmotivated (Puhl and Heuer, 2010). Those that are obese are often fully aware of these views and will internalize them, creating psychological distress (Collins and Bentz, 2009; Puhl, Heuer, 2010). This occurs in general society and in healthcare. Due to this, those that are obese often feel disrespected, unwelcome, and inadequate when consulting with a healthcare provider (Phelan et al., 2015). This inadequacy could be considered a healthcare disparity, where weight influences the treatment of the patient by the provider. In this case, obese individuals potentially receive sub-optimal care because of the stigmas and negative views as discussed above, or avoidance of healthcare for fear of being disrespected (Phelan et al., 2015).

In addition to the perpetual psychological distress overweight and obese individuals face because of their weight, they often have psychological problems that manifested their weight gain (Collins and Bentz, 2009). Obesity may be associated with underlying psychological problems, with those who are overweight or obese turning to eating and food as a means to cope for feelings of inadequacy, sadness, frustration, as well as anxiety and depression (Collins and Bentz, 2009). Eating serves as a temporary outlet, but often becomes cyclic as guilt is often with this behavior due to inability to control stress (Collins and Bentz, 2009). This learned helplessness is often the result of

multiple attempts to lose weight (Collins and Bentz, 2009). This can be from failed dieting attempts, injury from increasing activity levels, or the continued food/guilt cycle (Collins and Bentz, 2009). Consequently, although its manifestation is physical, and it is labeled as a physical disease, healthcare providers should not ignore its psychological impacts.

Obesity in Healthcare

As previously mentioned in the introduction, it is ideal for a primary care physician (PCP) and healthcare providers to be generally healthy. This picture of health, with the provider practicing recommended health behaviors, has provided statistical significance in greater patient adherence and cooperation in terms of lifestyle behaviors such as nutrition habits, weight, and physical activity (Oberg and Frank, 2009). The *Patient Promise* was implemented as a result of these studies and the observed number of overweight and/or obese healthcare providers (Lamber, 2009). Furthermore, healthcare providers are completely aware of the effects of obesity and co-morbidities that occur along with it thus, patients will hold healthcare professionals to a higher standard, expecting them to have optimal weight management and health (Bleich, Bennett, Cooper, and Guzune, 2012; Chapman, 1995; Phelan et al., 2015; Puhl and Heuer, 2010).

Although a normal BMI is idea, there are still various studies that indicate that healthcare professionals are not immune to effects of obesity. A Scottish study found that 29% of nurses, 17% of other healthcare professionals (doctors, dentists, pharmacist, and therapy professionals), and 35% of unregistered healthcare professionals were obese (Kyle, Neall, and Atheron, 2016). An Australian study demonstrated higher levels of obesity in nurses and midwifes than the general population (from 1.73% to 3.74% more)

(Bogossian, Hepworth, and Leon, 2012). Furthermore, an English study found higher levels of obesity in nurses than other healthcare professionals, but not statistically different than the general population (Kyle, Wills, and Mahoney, 2017). Kyle et al., (2017) concluded that obesity in healthcare can have serious negative impacts for capacity, sustainability, and safety of healthcare services. These negative impacts can lead to disruptive working patterns leading to greater risk for injury and illness, which therefore leads to reduced productivity and premature workforce exits (Kyle et al., 2017). In order for the patients to buy into healthier behaviors, it is important for the provider to role-model these behaviors. Though there are no studies on obesity in specific populations such as athletic training or sports medicine specialties in primary or emergency care, the same research could be applied to the present study. Through anecdotal evidence, the research can verify that many athletic trainers have irregular eating patterns and behaviors, often unhealthy, which can contribute to health disparities such as obesity. Many may expect ATs to have a greater picture of health due to working in a physical active environment, but as stated above, no one person is immune to the effects of obesity. This demonstrates the importance of measuring levels of physical health in ATs.

Disordered Eating, Eating Disorders, and Feeding Disorders

Although obesity is an epidemic, affecting 30% of adults in the United States, the opposing side, disordered eating, has its own brand of complications. Like obesity, disordered eating is both physical and mental and can manifest into many different variations (Gideo, Hawkes, Mond, Saunders, Tchanturia, and Serpell, 2016). Unlike eating disorders, obesity is not classified as a mental disorder due to its large range of

physical contributing factors. A true eating disorder (ED) needs to meet specific criteria for diagnosis set by the Diagnostic Statistical Manual of Mental Disorders-5 (DSM-5) (Smink, van Hoeken, and Hoek, 2012; APA, 2013). The DSM-5 characterizes eating disorders as a "persistent disturbance of eating and related behavior that can significantly impair physiological and psychosocial functioning" (APA, 2013). Maguen et al., (2018) states that at least 30 million people in the United States are suffering from an ED.

It should be noted that disordered eating is not the same as an eating disorder or a feeding disorder. Disordered eating (DE) does not require a diagnosis, but it can include behaviors that reflect symptoms of an eating disorder and are common precursors to EDs (APA, 2013). Disordered eating involves unhealthy or disturbed eating patterns that can include restriction, compulsions, and/or skipping meals (APA, 2013). Feeding disorders (FD) mostly occur in children, where one refuses to eat certain types of foods based on texture, whole food groups, solids, liquors, or eating non-food items, leading to delays in medical, nutritional, feeding skill, and/or psychological dysfunction (Praveen, et al., 2019; APA, 2013). Currently, the DSM-5 recognizes six diagnoses for eating and feeding disorders: anorexia nervosa (AN), bulimia nervosa (BN), binge eating disorder (BED), pica, avoidant/restrictive food intake disorder (ARFID), and rumination disorder (APA, 2013). The three FDs; pica, avoidant/restrictive food intake disorder, and rumination disorder mostly occur in childhood and often have co-morbidities such as autism spectrum disorders or other intellectual disabilities associated with them. Though they are important to understand, they will not be included as part of this research due to their low incidence in adult populations. It is important to note that in addition to these more commonly known EDs, two others: other specified feeding or eating disorder and

unspecified eating or feeding disorder, are included in the DSM-5 as diagnoses for atypical and/or emergency room symptoms of ED or feeding disorders (APA, 2013). Like obesity, no one, including ATs, are immune to the effects of EDs. The next section will complete an in-depth exploration of the three generally known EDs, as they have the highest likelihood of affecting the research population.

Eating Disorders

The three generally known eating disorders, anorexia nervosa (AN), bulimia nervosa (BN), and binge-eating disorder (BED) have the common onset of adolescence or young adulthood (APA, 2013). It is important to note that mood disorders such as major depression, anxiety disorders, and bipolar disorder are commonly observed co-morbidly to these specific eating disorders and are often diagnosed in this same time period (APA, 2013). Anorexia nervosa is characterized by significant weight loss, restriction of food relative to requirements, intense fear of weight gain, disturbance in perception of body appearance, and maximum BMI of 17 kg/m^2 (APA, 2013). Binge eating and purging (via vomiting, exercise, or misuses of laxatives or diuretics) can be associated with AN, but significant weight loss is required and a decrease in BMI to differentiate from body mass (BM). Bulimia nervosa is characterized by discrete eating in a specified amount of time, eating an amount of food one would not normally eating, a sense loss-of-control during the eating episode, the behavior occurs for at least three months, and there is a sense of self-evaluation influence by shape and weight of body (APA, 2013). With the loss-of-control sensation, the individual will then have compensatory purging behaviors (vomiting, excessive exercise, misuse of laxatives, diuretics, or other medications) to prevent weight gain and for a diagnosis, there must be

a minimum of 1-3 of compensatory behaviors per week (APA, 2013). Binge-eating disorder is similar to BN but does not involve the compensatory purging behavior (APA, 2013). The binge-eating periods are the same, along with the loss-of-control, but the binge-eating episodes must be associated three of the following behaviors: eating until uncomfortably full, eating rapidly, eating large amounts when not hungry, disgust or guilt, and/or eating alone due to embarrassment (APA, 2013). No specific BMI is associated with the BM of BED; therefore, individuals with either disorder may go undetected due to their seemingly normal or overweight appearance (APA, 2013).

Physiological Consequences of Eating Disorders

Though a large component of DEs and EDs is psychological, they can have severe physiological impacts, which is why they have the highest mortality rate of all mental disorders (Smink, van Hoeken, and Hoek, 2012). The impact of BED is similar to that of obesity, leading to an influx of weight gain in adipose tissue which can lead to type-2 diabetes, heart disease, joint and mobility problems, stroke, hypertension, etc. Anorexia and Bulimia nervosa can face similar issues but are due to opposing causes.

As stated previously, AN is characterized mostly by severe restrictive and purging behavior due to intense fear of weight gain (Sidiropoulos, 2007). The minimum recommend number of calories for an adult is 1,800 for sedentary individuals; more are needed with increased activity levels (USHHS USDA, 2015). Those with AN typically restrict to 400-700 kcal per day, often accompanied with compulsive exercise (Sidiropoulos, 2007). This leads to a lack of proper nutrients, which effects every system in the body that can be fatal if not treated (Sidiropoulos, 2007). The conditioned semi-starvation state, as coined by Barbosa-Saldivar and Van Itallie (1979), leads to atrophy of

the heart, resulting in hypotension and bradycardia. This slowing of blood flow can cause syncope, fatigue, weakness, and poor circulation leading to coldness in the extremities. When the blood flow is slowed, hematological hypofunction occurs leading to anemia (low iron) and leukopenia (lowered ability to fight infection). The kidneys ability to concentrate substances becomes decreased, leading to polyuria (excess urine production and passage) (Weiner, 1985). Additionally, cognitive changes can occur from the starvation state due to a reduction of white and grey matter (Sidiropoulos, 2007). Furthermore, the body's stores of glycogen and fat, are converted to glucose for quick energy. This causes muscle breakdown, and a low body fat percentage leading to fatigue, the sensation of being cold, and low energy availability (Weiner, 1985).

Bulimia's effects are not as staggering as the effects of AN. However, the stomach can become overly alkaline due to constant vomiting, leading to erosion of the stomach lining, esophagus, and dental enamel (APA, 2013). The vomiting can in-turn place stress on the electrical configuration of the heart (Myatt, 2014). This can be caused by dehydration, which causes an electrolyte imbalance, which therefore can cause erratic cardiac muscle contraction which can compromise life (Myatt, 2014). Additionally, dependency to laxatives can develop due to overuse leading to malfunctioning bowls (APA, 2013). It is clear that the physiological manifestations of EDs are just as substantial as the mental processes that occur with them. Because of this, association of co-morbidities can be complicated to treat. The next section will explore these discrepancies.

Flaws in ED Healthcare

Although the DSM's primary use is for diagnosis of mental disorders, it also provides codes for insurance companies and with the strict criteria for diagnosis, some individuals may not meet it and therefore not be eligible for care underneath their insurance policy (APA, 2013). Due to this limited diagnosis and insurance coverage for treatment, eating disorders, specifically anorexia nervosa, have the highest mortality rate of any psychological condition (Smink et al, 2012). Although the DSM-5 does include two additional diagnoses: other specified feeding or eating disorder, and unspecified feeding or eating disorder, the criteria supplied by these two may not be enough to provide insurance coverage (APA, 2013). Furthermore, typical ED behavior involves a sense of strict privacy, or keeping their condition hidden in an effort to remain in control of the situation (APA, 2013; Smink et al., 2012). Unfortunately, the delusion of the ED prevents the victim from realizing the condition is actually spiraling them out of control (APA, 2013). Because of this secrecy, epidemiological data is flawed from patients denying or concealing their truths of disordered eating (Smink et al., 2012). In an effort to help combat this, various screening tools are used in healthcare to identify the associated behaviors. The next section will compare and contrast the most popular tools to identify EDs.

Screening Tools

Though eating disorders such as AN may be blatant to some observers, others such as BED and BN are not easily as detectable due to seemingly normal or overweight BMI that is associated with each. In order for the patient to have the best outcome, early detection is vital. This section will discuss a variety of screening tools used in primary

care. The SCOFF questionnaire, named for a variable it asks in each of its 5 questions, is one of the most popularly used screening tools for EDs, due to its quick and easy administration, high sensitivity, and high specificity (87.5%) (Morgan, Reid, and Lacey, 2000). The authors suggest it is merely used as a screening tool rather then one for diagnosis (Morgan et al., 2000). However, this questionnaire only tests for BN and AN, BED is not included (Morgan et al., 2000). Binge eating disorder was not added to the DSM until 2013 (which is the most current version), while the SCOFF was created in 2000 (APA, 2013; Morgan et al., 2000). In an effort to stay up to date, numerous other tools have been created, and/or updated in order to stay clinically relevant. The Screen for Eating Disorders (SDE) is very similar to the SCOFF, in that it is short, easy, highly specific and sensitive, and used as a screening tool rather than a diagnostic tool (Anstine and Grinenko, 2000). However, even though BED was not a true ED at the time, criteria for screening it was included in the SDE (Anstine and Grinenko, 2000). Although the SDE is a seemingly easy tool to use, scoring is not clearly instructed, nor did the tool become nearly as popular as the SCOFF. Longer questionnaires, such as the Eating Disorder Questionnaire (EDE), are more thorough and give greater information about the patient (Fairbur, Cooper, and O'Connor, 2008). Though it is very useful in finding detailed information, the EDE is an interview-based tool, taking up to 45 minutes to administer. This often exceeds appointment time limits in primary care settings and therefore is of no use. In a response to that, a self-report version was created and then a shortened version. Both are highly sensitive and specific, while also decreasing time and allowing for more client interview in an appointment (Fairbur et al., 2008). The short version of the EDE, the EDE-QS will be discussed thoroughly in chapter 3, as it was

chosen as a tool to measure ED patterns for the present study. In order to use these tools, one must have a certain level of education regarding eating disorders. AT education relating to EDs and roles in the referral process are discussed in the upcoming section.

Educational Standards

The National Athletic Trainers Association (NATA) position statement on eating disorders gives specific information for ATs about prevention, detection, and management in athletes with DE and EDs (Bonci et al, 2008). Specific accreditation standards require AT education programs have planned opportunities to discuss EDs in general and athletic populations, allowing newly credentialed ATs to have a broad and finite approach to care and referral processes (CAATE, 2020). With the NATA position statement and programmatic inclusion, athletic trainers should be well versed in the manifestations of DE and EDs. Moreover, physicians have the duty to act when it comes to EDs as well. Using proper screening tools in primary care and catching the disorders early can allow the patients to get optimal care (Maguen et al., 2017). Without proper screening, the EDs (such as BED or BN) may often be overlooked in patients who are trying to lose weight with little success and thus continuing the binge and/or purge cycle (Maguen et al., 2017). Furthermore, although ATs learn about the effects and treatment of obesity, disordered eating, and eating disorders in their curriculum, they are not immune to the effects of either. It is important to recognize these factors in healthcare, in order to provide the patient with as much education and support possible. Additionally, it is important to recognize that the bias and stigma of patient and provider can manifest in both directions, which can significantly impact the patient-provider relationship (Frank and Oberg, 2009). Eating disorders have proved to have high morbidity levels, difficulty

with treatment, and often occult to the naked eye. Fortunately, screening tools and continued education can help in the process and potentially lead to a healthy outcome for the patient. A large part of eating disorder recovery involves nutrition counseling, or how to properly eat with response to mental and physical triggers. Nutrition is not only important to ED patients, but to the population in general. The following section will explore recommendations of nutrition in terms of variety, patterns, habits, and frequency for Americans.

Nutrition

The study of nutrition involves looking at the how the human body ingests, digests, absorbs, transports, metabolizes, interacts, stores, and excretes nutrients in foods (Whitney, Hamilton, and Rolfes, 1990). It is a key variable in the present study, as it needed for all bodily processes and is easily overlooked by many, resulting in many health disparities. Nutrition levels can be deemed adequate or malnourished. Malnutrition can be either undernutriented, which is a lack of proper nutrients that can affect growth and development, or overnurished, which is an excess of nutrients, leading to excess energy (Smolin and Grosvenor, 2013). The following section will discuss a basic overview of nutrients and their importance to the body, recommended healthy eating guidelines set forth by the US Department of Agriculture (USDA) and US Department of Health and Human Services (USDHHS), best practices for eating in American adults, and finally educational standards for nutrition for ATs.

Baseline Dietary Guidelines for Americans

Nutrients are needed for the body to properly function. When nutrients are consumed with intention, in proper pattern, nutrient density and variety, the body

benefits. However, most Americans do not know how to properly fuel the body: eight in ten Americans find that nutritional information is conflicting (USDHHS, 2015). In an effort to provide credible, easily understandable information, the USDA and USDHHS created the *Dietary Guidelines for Americans* in 1980 in order to address basic nutritional needs and concerns (Drewnowski, Dwyer, King, and Weaver, 2019). Since then, the *Dietary Guidelines for Americans* has been re-reviewed every five years with updated research and best practices. Most of the information is based on the recommendation of an average consumption of 2000 kilocalories per day (USDHHS, 2015). The details of the current research project will use 2000 kilocalories as the baseline. It should be noted that more specific caloric intakes are based upon sex, age, weight, height, and activity level. Currently, the *Dietary Guidelines for Americans* states: follow a healthy eating plan across the lifespan, shift to healthier, nutrient-dense, rather than calorie-dense foods and beverages, and support healthy eating patterns for all in order to improve overall eating patterns and live a healthier lifestyle; all will be investigated in the upcoming sections (USDHHS, 2015).

Healthy Eating Patterns

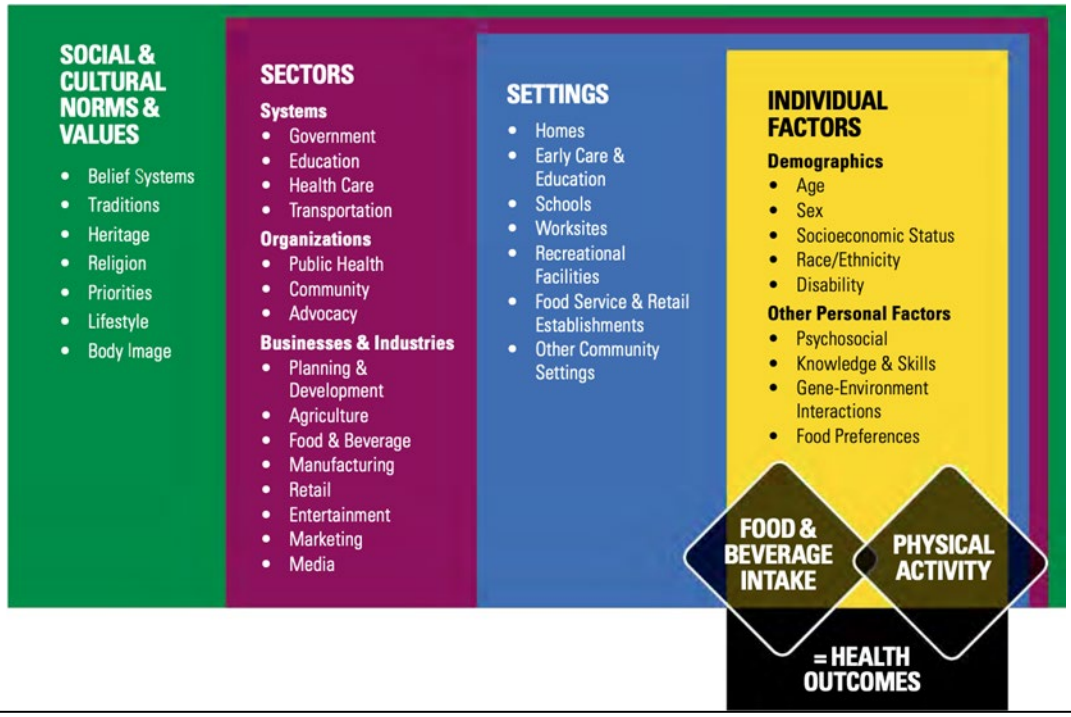
The main principles of healthy eating patterns across the lifespan include: eating foods and beverages together in order to meet complete nutritional needs without exceeding limits, meeting nutritional requirements from food sources rather than supplements, and that healthy eating patterns are adaptable for each individual and can be tailored to their specific needs, preferences, culture, and socio-economic status (USDHHS, 2015). Healthy eating patterns have demonstrated evidence for lowering risk for cardiovascular disease, type 2 diabetes, certain cancers, and obesity (USDHHS,

2015). The idea behind eating in a healthy pattern is to meet the recommended dietary allowances, along with essential nutrients (USDHHS, 2015). Three accepted patterns include the Healthy-US style, healthy vegetarian, and healthy Mediterranean-style (Drewnowski et al., 2019). The literature further states that even if an eating pattern is not healthy, the patterns across a lifespan can be a greater predictor for overall health status than when looking at consumed foods and nutrients individually (USDHHS, 2015).

In addition, healthy eating patterns are influenced by social and cultural norms and sectors. These sectors will influence individual demographic factors when trying to switch to a healthy lifestyle. The following model (figure 2.1) demonstrates how each layer affects another, and how they are all required into order to develop a healthy pattern (USDHHS, 2015). For example, religion and belief systems play a huge role in what type of eating pattern one may subscribe to. Eating patterns such vegetarian and vegan may be a result of a belief system or religion (Johnson, 2015). In order to further enhance healthy eating, healthcare professionals must have a level of cultural competence and awareness of these various contributions to one's lifestyle. In order to have a greater understanding of nutrition patterns, we will now investigate nutrition variety and recommendations for each.

Figure 2.1

Social-Ecological Model for Food and Physical Activity Decisions (USDHHS, 2015)



Nutrition Variety and Recommended Amounts

It is ideal to eat a variety of nutrient-dense foods, rather than foods that provide discretionary calories when trying to implement a healthy diet. Nutrient dense foods contain a selected amount of nutrients per serving size, usually within 100 kilocalories or grams (Drewnowski et al., 2019). Foods are grouped based on similar nutrient composition such as fruits, vegetables, meat, and then can be further sub-divided (Drewnowski et al, 2019). Those that are richer in essential nutrients, protein, fiber, vitamins, and minerals with less saturated fats, sodium, and added sugar are usually more nutrient dense.

Each person should ideally meet the minimum number of nutrient-dense foods required each day however, this is easier said than done. Many Americans often over-indulge in foods with high amounts of discretionary calories before meeting the recommendations of nutrients. Discretionary calories, or foods with saturated fat, sodium, refined grains, and added sugar usually contain minimal recommended nutrients than nutrients per serving size and are often considered calorie-dense (Drewnowski et al., 2019). Most calorie-dense foods are located in the middle of grocery stores: prepacked, convenient, and often ready-to-eat out of the package. Additives and preservatives are added to these foods in order to increase shelf-life and preservation, as well as making them more palatable. Consuming these types of foods can make it difficult for an individual to meet their nutrient needs while maintaining caloric limits (USDHH, 2015). The USDHHS (2015) recommends consuming less than 10% of calories from added sugar. For saturated fat (which can increase levels of LDL cholesterol and put someone at risk for heart disease), it is recommend to consume less 10% calories per day and use an unsaturated fat as a replacement (USDHHS, 2015). Although sodium is an essential part of the diet, the recommended intake is less than 2,300 milligrams per day (USDHHS, 2015). Finally, alcohol should be consumed in moderation; one drink per day for females and two drinks per day for males; one drink is equivalent to 12 fluid ounces of beer, 5 fluid ounces of wine, or 1.5 fluid ounces of 80 proof distilled spirit (USDHHS, 2015).

The US dietary guidelines have remained stable since the 1980s but are reviewed every five years, based upon new evidence (Drewnoswki et al., 2019). The USDHHS currently recommends consuming a variety of nutrient dense foods and meeting nutrient

intakes within energy needs, and when it comes to food groups, it is suggested to choose fiber-rich vegetables, fruits, and whole-grains as often as possible.

The recommended amount of vegetables to consume is about 2.5 cups per day per 2000 calorie diet (Drewnoski et al, 2019; USDHHS, 2015). Vegetables have a high nutrient density and low-calorie density, meaning that more can be consumed to stay within energy needs (USDHHS, 2015). Additionally, 1/5 of vegetables should be dark leafy greens or orange vegetables, and 1/8 of the total amount should be greens and/or beans (Drewnowski et al., 2019).

It is recommended to eat whole, fresh fruit without additives, about two cups per day, to ensure proper fiber intake (USDHHS, 2015). Fruit juices may be substituted as long as they are 100% fruit; however, fiber is removed in juices and whole fruit is encouraged in order to retain full nutrient provision (Drewnowski et al., 2019; USDHHS, 2015).

Grains contain single wholefoods such as rice, oatmeal, and corn, as well as prepared products such as bread, cereal, and pasta. Whole grains such as brown rice, oats, and quinoa, contain the entire portion of the grain and provide greater fiber than refined items such as white bread, instant oatmeal, and breakfast cereal which remove the germ, bran, and/or fiber from the whole grain, as the removal of part of the grain lessens the nutrient density (USDHHS, 2015). It is recommended to eat six ounces of grains per day, with at least half of these grains wholegrains (USDHSS, 2015).

The USDHHS (2015) recommends consuming consume three cups per day of low to non-fat milk and/or dairy products (Drewnowski et al., 2019). Soy “milk” products, derived from soybeans, that are fortified with calcium, vitamins A and/or D, can be

included in this category because the nutrient composition is similar to that of real dairy products. However, nut beverages such as almond milk or grain beverages such as oat milk, do not have similar nutrient compositions to dairy and cannot be included in this category (USDHHS, 2015).

Protein sources can be derived from animal and plant sources: meats (beef, pork, venison, etc.), poultry (chicken, turkey), seafood (fish, crustaceans, mollusks), eggs, nuts, seeds, soy, and the combination groups (protein and vegetable classification) of beans and peas; should be consumed in a variety as they have their own unique structures, and low-fat or fat-free proteins choices are optimal (USDHHS, 2015). The recommended intake of protein is 5.5 ounces per day (USDHHS, 2015). The USDHHS also recommends eating eight ounces of seafood or plant protein in one week in order to add further variety of nutrients (such as EPA and DHA, essential fatty-acids found in Omega-3, which are associated with reducing cardiac-related deaths) not usually found in common sources such as beef or poultry (USDHHS, 2015). The next section will demonstrated how to shift to these healthier choices.

Shifting to healthier choices in food and beverages

Making healthy choices when it comes to food, beverage, and eating patterns does not happen within a day or week. It takes time for the routine to set in and for tastes to change. Approximately one in four Americans have a healthy eating pattern that is rich in the recommend variety of food from pervious sections (USDHHS, 2015). The USDHHS (2015) suggests replacing vegetables for refined grains, always choosing a vegetable as a side dish, adding a dark green salad to each meal, and choosing vegetables as snacks. For fruits, it is recommended to shift to eating fruit for snacks, as a sweet replacement, rather

than refined baked goods such as cakes, cookies, candy, and ice cream (USDHHS, 2015). For grains, shifting to items that have labels such as "100% whole wheat" listed in the ingredients will help Americans meet the recommendation of "keeping half your grains whole." Dairy recommendations include shifting to low-fat or non-fat items and drinking a milk beverage with each meal. The same goes for protein; lean options but include a great variety of protein choices. Finally, in terms of discretionary calories, the USDHHS (2015) recommends shifting to no-sugar-added, fresh, frozen, un-sauced, no-salt-added items, and using herbs rather than added sodium to season food. This concludes the discussion on the USDHHS guidelines for healthy eating. However, the discussion on nutrition is far from over. The next section will explore the nutritional education standards for physicians and athletic trainers.

Nutrition Education Standards

Athletic trainers are required to have foundational coursework in nutrition either before entering a professional athletic training program and/or within the program (CAATE, 2020; Smith Rockwell, Nickols-Richardson, and Thye, 2001). Accreditation standards for professional masters' athletic training programs require students to make nutritional decisions based upon performance and climate (CAATE, 2020). Furthermore, the NATA released a position statement regarding safe weight loss and maintenance in sport and exercise to ensure ATs are taking proper precautions with sports that closely monitor weight such as wrestling, rowing, and boxing (Sammarone Turocy et al., 2011). Though these standards regarding nutrition are ideal and Torres-McGehee et al. (2012) has demonstrated that though ATs are "adequate" in their knowledge of nutrition, ATs are still lacking in nutritional knowledge and potentially using improper information.

This may be related to the fact that many older clinicians did not receive this nutritional training through their preparation or through continuing education. Musculoskeletal issues are often the primary focus, with nutritional counseling often lacking in treatment plans (Smith Rockwell et al., 2001). Though athletic trainers may acquire adequate knowledge in nutrition through academic programs, a shift for greater nutritional education needs to occur. Additionally, as part of a treatment plan for musculoskeletal injury, it is imperative that ATs start including nutritional counseling as part of a comprehensive, and holistic approach to the health of the patient. This approach and the impact it has on patient compliance will be discussed below.

Nutritional Counseling

In an effort to understand patient perceptions in healthcare, the Academy of Nutrition and Dietetics sent out a survey inquiring about credibility of nutritional information. The researchers discovered that 61% of the respondents believe that physicians are a "very credible" source (Nutrition and You, 2008). Conversely, 86% of internal medicine interns feel they are not properly trained in nutritional counseling (Vetter et al., 2008). Seventy percent of United States causes of death are chronic diseases with nutrition being a strong contributing factor to most, thus it is critical that physicians include nutritional counseling in their treatment plans (Early et al., 2015). As stated previously, provider health has a great impact on patient health in terms of adherence and cooperation from the patient (Oberg and Frank, 2009). Physicians need to be adequately trained in order to address the high percentage of obesity and related diseases in the United States. However, this lack of confidence in nutritional counseling and lack of nutrition education can prevent the physician from offering greater health

advice (Baute et al., 2019). Research in 1995 suggested the same information: physicians do not feel confident enough or have time limitations when it comes to nutritional counseling (Kushner, 1995). However, since 1995 little has changed in regard to confidence in nutritional counseling in physicians. The research further suggested that by 2000, the objective was to increase nutritional counseling or referral within primary care 75% (Kushner, 1995). Based on the latest research, 25 years later, this still has not occurred (Conroy, Delichatsios, Halfer, and Rigotti, 2004; Baute et al., 2018). Although this research was completed on physicians, it remains relevant when translated to athletic training. In an effort to better understand disparities in nutritional counseling, in the sense of patient role-modeling, eating habits of related healthcare fields will be explored in the next section.

Eating Habits in Related Healthcare Fields

Though athletic trainers and other healthcare professionals are aware of the nutritional causes of cardiovascular disease, type 2 diabetes, obesity, and other related diseases, it does not guarantee they are taking proper steps to have balanced nutrition in their own lives. There are few studies that investigate the eating habits of healthcare professionals. Most research is focused on student populations.

Results from a study on the eating habits of female medical students, indicate that less than half of the students surveyed eat the recommended amount of vegetables and fruit for their age group, per day (Akthar, Zareen, and Sarmad, 2018). Additionally, almost two-thirds of those surveyed were consuming more fast/junk food, than any other food, daily, with little nutritional value (Akhtar, Zareen, and Sarmad, 2018). However, most students ate regular breakfast and consumed three meals per day (Akhtar, Zareen,

and Sarmad, 2018). A Polish study on medical students eating habits indicated that their daily food rations were imbalanced, with both sexes consuming more protein than recommend (Grygiel-Gorniak, Tomczak, Krulikowska, Pryzslawski, Seraszek-Jaros, andKaczmarek, 2016). Furthermore, females were often under consuming in all food groups in an effort to keep a thinner body profile (Grygiel-Gorniak et al., 2016). Another study indicated that Turkish nursing students are very likely to skip main meals (89.5%), with one third of that being breakfast (Gunes Bayir and Guclu, 2018). Various other studies using general university students indicate their lack of fulfilling all nutritional needs, especially fruits and vegetables (Teleman, de Waure, Soffiani, Poscia, and Di Pietro, 2015; Petkov, 2019). Finally, an older nutrition habit study on ATs demonstrated they generally do not follow nutritional recommendations and ate a lot of discretionary foods, high in fats and added sugars (Groth, Ayers, Miller, and Arbogast, 2008). Although most of these results are in student populations, parallels can be drawn in the type of education and time allotments in sports medicine professions such as ATs. Additionally, although there are recommendations for eating for a healthier lifestyle, many people chose to ignore them and "diet" in order to reach what they consider their picture of health. Diets and dieting will be explored in the next section.

Diets and Dieting

The term "diet" has two definitions. It could be considered the food that one eats to sustain life, or a special variety of food, that is usually restricted, intended for weight loss or medical reasons (de Ridder, Adriaanse, Evers, and Verhoeven, 2014). An alternative diet could be related to religious practices or belief systems, (such as veganism) as discussed previously (USDHHS, 2015). The first definition was discussed,

at length, in the nutrition section. However, going on a diet, or dieting, is common within the United States when one wants to lose weight. Weight-loss dieting is controversial, as it generally is ineffective in the long-term due to individual's inability to adhere and successfully lose weight (de Ridder et al., 2014; Bourke, 2012). Furthermore, weight-loss dieting can lead to maladaptive patterns such as binge-eating that usually occurs when trying to counter-regulate the restriction that was present during the diet (de Ridder et al., 2014). Despite this, most people in the United States weight-loss diet with about 63% following some kind of restricting diet (de Ridder, et al., 2014). This is prevalent in both sexes, but a higher correlation is found with young females (de Ridder, et al., 2014). Many attempt weight-loss diets due to negative attitudes on weight, body shape, and appearance which results in stress and reduced pleasure in eating (de Ridder et al., 2014).

Weight-loss dieting can cause one to become obsessed with their intake, despite having proper knowledge, leading to further psychosis (de Ridder et al., 2014). When the weight does not decrease as expected, despair and learned helplessness ensue, resulting in a vicious cycle of "yo-yo" dieting (Bourke, 2012). Though most weight-loss diets generally are not successful, the USDA's recommendations for developing and following a healthy eating pattern are ideal. Additionally, the American Heart Association (AHA) suggests three key concepts when trying to lose weight: think smart, eat well, and move more, rather than limiting or restricting food groups (AHA, 2005). The following section will explore recommended diets by the USDA, as well as popular fad diets.

Recommended Diets

The USDA has three recommended eating patterns: healthy US-style, healthy vegetarian, and healthy Mediterranean-style pattern (USDHHS, 2015). They are nutrient-

dense eating patterns, designed to meet all recommended nutrient needs. The healthy eating pattern was discussed significantly in the above sections. As a review, it recommends eating a variety of nutrient-dense foods from each category, limiting discretionary calories from added sugars, sodium, saturated and trans fats, and alcohol, and to ensure daily intake is within given caloric intake based on height, weight, and sex of the individual (USDHHS, 2015). The Mediterranean-style eating pattern in similar to the healthy US-style pattern, but it contains more daily fruits (2.5 cups vs. 2) and weekly seafood (15 ounces vs. 8) and less daily dairy (2 cups vs. 3) (USDHHS, 2015). The healthy vegetarian plan follows the US-style healthy eating but does not contain animal proteins except for dairy and eggs (USDHHS, 2015). The protein category is subdivided differently to include eggs, legumes, soy products, and nuts and seeds, rather than lumping all sources of protein into one category like the healthy US-style does. The diet recommends 3 ounces of eggs, 6 ounces of legumes, 8 ounces of soy, and 7 ounces of nuts and seeds per week in order to fulfill protein nutrient needs (USDHHS, 2015). Although these eating patterns are recommended, as they meet all nutritional needs, many chose to overlook or simply ignore proper health advice in favor of fad diets, which will provide instant gratification in terms of weight loss. Fad diets are discussed in the next section.

Fad Weight-Loss Diets

With the rise in obesity, many people are trying new ways to prevent weight gain, maintain their current weight, or lose weight. With this desire, many turn to fad dieting due to their claims of quick weight loss (Khawandanah and Tewfik, 2016). The CDC defines a fad diet as a weight loss plan that promises quick results and temporarily

nutritional change (CDC, 2020). Most fad diets promise quick weight loss without having to give up lifestyle or cause much effort, limit a range of food types, and/or propose miracle foods that need to be consumed in abnormal quantities or at varying times (Khawandanah and Tewfik, 2016). Most, if not all fad diets are not sustainable long-term (HRF, 2014). They require a lifestyle change, which usually requires a great deal of preparation (HRF, 2014). Once an individual stops dieting and returns to their previous routine, they will most likely regain the weight they had lost (HRF, 2014). Despite all these miraculous claims, the advertisements rarely provide valid healthy warnings or information (Khawandanah and Tewfik, 2016). Furthermore, the advertisements are usually endorsed by a celebrity figure suggesting that a certain body type is ideal (Khwandanah and Tewfik, 2016). This peer pressure can lead to emotional distress such as low self-esteem, depression, or eating disorders (Kwandanah and Tewifik, 2016). The constant influx of body-image and dieting related information can lead to obsessions with food, obsessive calorie counting, greater distractibility, and fatigue (Polivy, 1996). The next section will outline a brief timeline and give a succinct explanation of the most common varieties of fad diets.

In the 1800s diets such as vinegar and water beverages were popular in an effort to lose weight (Kwandanah, Tewfik, 2016). The 1920s suggested smoking cigarettes as a way to curb appetite (Kwandanah, Tewfik, 2016). The popular “Hollywood Diet” was implemented in the 1930s detailing that one should consume a grapefruit with each meal due to its ability reduce fat (Kwandanah, Tewfik, 2016). Weight Watchers, a calorie counting program, was first implemented in 1961 and is still popular today, because it features components to lose weight and keep it off such as food plans, activity plans,

behavior modification with cognitive restructuring, and peer support groups (Kwandanah, Tewfik, 2016; Carlson, 2014). In 1992, the low-carbohydrate craze, promising quick, easy, weight-loss began with the Atkins Diet (Kwandanah and Tewfik, 2016). Aside from these historical diets, there are even more that require various stipulations. High-protein, low-carbohydrate diets include Atkin's, Dukan, South Beach, and Zone (Kwandanah and Tewfik, 2016). Moderate-fat, low-carbohydrate diets include Jenny Craig, Nutri-system, and Weight Watchers (BDA, 2014). Low-fat and very-high-carbohydrate include: Ornish, The New Pritikin Program, and LEARN (BDA, 2014). Very-low calorie diets include: Berstein, Lighter Life, and Slim Fast (BDA, 2014).

Low carbohydrate and high fat diets are particularly popular due to their rapid weight loss (Kwandanah and Tewfik, 2016). However, this rapid weight loss is mostly water loss. Once the individual discontinues the diet, the body tries to correct the water imbalance, and has to use carbohydrates as its primary fuel again, causing the individual to gain all, if not more of the weight back (Kwandanah and Tewfik, 2016). Diets such as Atkins have demonstrated higher risk of heart disease, colon cancer, and bad breath because of the specific eating pattern focusing on high fat and protein, and low carbohydrate (Kwandanah and Tewfik, 2016). One of the most popular current diets, *The Ketogenic Diet*, works in this way as well, using fats as a primary fuel source as the body goes into ketosis (Kwandanah and Tewfik, 2016). Excess ketones in the blood can result in dehydration and death, as glucose is needed for proper bodily processes and normal brain function (Kwandanah and Tewifik, 2016).

High carbohydrate and low-fat diets are also popular. However, due to the lack of proteins and fats in the system, tissue healing can be impeded, as well as decreased

immune responses leading to greater risk of illness (Kwandanah and Tewfik, 2016). Other diets that limit specific foods (vegan), are liquid only (juicing), or those that are low-calorie put the body at risk for malnourishment (Kwandanah and Tewfik, 2016). Figure 2.2 displays further advantages and disadvantages of popular diets.

Figure 2.2

Popular Fad Diet Pros and Cons (Kwandanah and Tewfik, 2016)

Types of diets	Pros	Cons
High-protein diets: *Atkins, Dukan, South Beach, Zone*	• Rapid weight loss • Increase satiety • Improved TG level • Improved serum cholesterol	• Not sustainable • High-fat content • Nutrient deficiency • Detrimental to brain and heart • Increased risk for CHD
Moderate-fat, high-carbohydrate diets: *Jenny Craig, Nutri-System, Weight Watchers*	• Reduced saturated fat intake • Increased consumption of fruit and vegetables • Significant weight loss • Reduction of the risk for diabetes	
Low-fat, very high-carbohydate diets: *Ornish, The New Pritikin Program*	• Possible reduction of cardiovascular disease risks	• Increased TG levels • Decreased HDL-C levels • Micronutrient deficiency
Very low-calorie diets: *Bernstein, Leighter Life, Slim Fast*	• Initiates quick weight loss • Improved quality of life • Long-term benefits in conjunction with exercise	• Enhanced diuresis • Electrolyte loss • Disturbed acid-base balance • Should be used only under medical supervision

Although there are many disadvantages to fad dieting, there few advantages. Some of the diets are rich in fruits and vegetables, which give the body a good amount of nutrients one may not be used to. Short-term weight loss can increase confidence and reduce obesity risk (Kwandanah and Twifik, 2016). Furthermore, the diets can help someone recognized their current unhealthy eating behaviors that may be responsible for

the excess weight, and therefore assist in understanding of portion control and avoiding unwanted overconsumption of food (Kwandanah and Twifik, 2016). Despite these advantages, the disadvantages discussed above greatly outweigh them. In order to round out the discussion on diets, other diets, such as medically induced, and elimination diets will be investigated.

Modified/Acceptable Diets/Patterns of Eating

As previously discussed, weight-loss diets and dieting can be confusing to the lay audience, especially with the influence of media in the current age. Comparatively, there are still other habits and patterns of eating such as medically induced diets and elimination diets. These diets are not intended for weight loss, but for life-sustainability (Arscott, 2018). The idea of an elimination diet is to omit a certain food group that may be causing an adverse reaction (Arscott, 2018). This can be due to an intolerance, which are normally non-life threatening, or an allergy, which can be life threatening (Arscott, 2018). Common food intolerances involve lactose (sugar found in dairy) and gluten (protein derived from wheat products) (Arscott, 2018). Common allergies involve tree nuts, peanuts, soy, and/or shellfish (Arscott, 2018). Unlike fad diets, these diets are meant to be sustained for the remainder of life (Arscott, 2018). It is important to look for suitable alternatives to the foods that are eliminated in order to meet the USDHHS's guidelines for nutrients (USDHHS, 2015). Although medically recommended elimination diets, are prescribed for those in need, fad dieting has marketed some of these diets as weight-loss strategies. Consequently, it is important for consumers to discern the evidence presented when considering any kind of diet, whether it is recommended, fad, based on a belief system, or medical necessity. A final discussion on measuring eating

patterns, food frequency, food habits, and dieting will conclude the discussion on nutrition.

Physical Activity

Beyond nutrition and diet, the other component related to physical health, weight, and weight loss is physical activity. The World Health Organization's (2020) definition of physical activity (PA) is any bodily movement that requires use of skeletal muscle and expends energy. Regular PA has been demonstrated to reduce risk of hypertension, heart disease, diabetes, stroke, various cancers, depression, and improves bone health, fall risk in older adults, sleep, anxiety, ability to control weight, and overall quality of life (WHO, 2020). Additionally, it can prevent fatigue from activities of daily living at all age levels (USDHHS, 2018). Unfortunately, PA is not held to a high standard among many: physical inactivity is the fourth leading risk factor for death globally (WHO, 2020). By engaging in more physical activity, it can reduce the annual US healthcare costs ($117 billion) by approximately 10% (USDHHS, 2018). Additionally, in combination with recommended eating guidelines, it can assist in maintaining a healthy weight by preventing weight gain, losing weight, and keeping the weigh off once it is lost (USDHHS, 2018). The US Department of Health and Human Services has created recommend guidelines for PA in Americans in an effort to decrease this mortality rate, making it an essential resource for health professionals. It features guidelines for each age, but only adult guidelines will be discussed for this research (USDHHS, 2018). The four key guidelines for adults are as follows: 1) move more and sit less, 2) PA should involve 150 to 300 minutes moderate-intensity aerobic PA per week, or 75-150 minutes vigorous-intensity aerobic PA per week, or an equivalent combination of both, 3)

additional health benefits beyond the equivalent of 300 minutes of moderate-intensity PA per week, and 4) complete muscle-strengthening activities 2 or more days per week (USDHHS, 2018). Only 26% of adult males and 19% of adult females meet these recommendations (USDHHS, 2018). In order to have a greater understanding of these key guidelines, we will first dive into an exploration of activity levels and intensity levels.

Activity and Intensity Levels

Although moderate and vigorous intensity levels are recommended, there are also light levels for those trying to ease into PA. Light-intensity PA requires low levels of energy expenditure such as leisurely walking, cooking, or light household chores (USDHHS, 2018). Moderate-intensity activities include brisk walking, doubles tennis, or chores such as raking the yard (USDHHS, 2018). Vigorous-intensity activities include jogging, running, shoveling snow, strenuous fitness classes, carrying heavy loads; basically, anything to get the heart pumping significantly (USDHHS, 2018). The guidelines outline four different levels of activity: inactive, insufficiently active, active, and highly active (USDHHS, 2018). Inactive means that no activity is occurring beyond basic movements of daily life (USDHHS, 2018). Insufficiently active entails some activity is occurring (moderate or vigorous) but the minimum number of minutes is not met. Active involves meeting the recommended number of minutes in moderate and/or vigorous activity for the week (USDHHS, 2018). Highly active involves surpassing the recommended amount of PA for the week (USDHHS, 2018).

The recommendation is to complete 150 to 300 minutes moderate-intensity, or 75-150 minutes vigorous-intensity, or a combination of both that meets the recommendation

(USDHHS, 2018). Two minutes of moderate intensity count as one minute as vigorous intensity. When these numbers are met, significant risk factors such as various cancers, are reduced as well as prevention of unhealthy weight gain. Benefits include, greater sleep, improved cognition, greater quality of life, and potentially greater confidence (USDHHS, 2018). When the minimum amount of PA is surpassed (greater than 300 minutes of moderate-intensity), the benefits continue to increase (USDHHS, 2018) However, research has not identified a total ceiling of when benefits cease to occur (USDHHS, 2018). It should be noted to ensure proper amount of rest and to not over-exercise, in order to prevent injury and exercise addition. In order to better understand these activity levels and intensities, we will now discuss different variations of physical activity.

Variations of Physical Activity

The USDHHS (2018) guidelines for PA outline four different types of activity: aerobic, muscle-strengthening, bone-strengthening, balance, and flexibility. Aerobic, or cardio activity uses whole-body movement to cause the heart to beat faster and make breathing harder, therefore conditioning the cardiovascular system (USDHHS, 2018). It involves activities like brisk walking, cycling, jogging, running, rowing, swimming, and jumping rope. Additionally, it involves three different components: intensity (how hard a person works (light, moderate, or vigorous)), frequency (how often), and duration (amount of time spent in one session). Although these three components are ideal, meeting the minimum amount of time required per week demonstrates greater health benefits (USDHHS, 2018). Muscle-strengthening activity causes the muscles to work against a force using resistance or weight training. It involves intensity, frequency, and

sets and repetitions (how many times a single activity is completed). It is important to include all muscle groups for proper use. Bone-strengthen activity, or weight-bearing activity involves a force being applied to the skeletal system by an impact (USDHHS, 2018). These specific impactful activities can assist in prevention of bone-degradation and osteoporosis in adults (USDHSS, 2018). Bone-strengthening activities can include running, jumping jacks, walking, and some weight-lifting exercises (USDHHS, 2018). Balance activities can involve a combination of aerobic and strength training, by using the body to resist forces outside of the body than can cause it to become off-balance (USDHHS, 2018). It can include activities such as walking backwards, standing on one leg, and strengthening muscles of the back, core, and legs. Flexibility activities involve the joints going through their full range of motion. Stretching activities, dynamic (involving movement) and static (held in a position), allow can improve flexibility which will allow one to better complete other variations of activity (USDHHS, 2018).

Aerobic activity should occur over the duration of the week, with a minimum of three days to decrease risk of injury (USDHHS, 2018). Although aerobic activity is great to condition the cardiovascular system, it is important to include all types of activity in order to have a complete picture of wellness in PA. Muscular-strengthening allows the muscle to grow in a way that is not possible with aerobic activity, alone. It should occur at least two days per week (USDHHS, 2018). No time limit is recommended, but it should occur until muscles reach fatigue and repetitions per muscle group become difficult (usually 8 to 12 repetitions with 2 to 3 sets per exercise) (USDHHS, 2018). Aerobic and muscular activities should include exercises that specifically target bone-strengthening in order to meet recommendations (USDHHS, 2018). In addition,

flexibility is an important part of PA, but does not count toward meeting guidelines. It is used as a key supplement to better develop aerobic and muscular strength (USDHHS, 2018). Understanding intensity, activity level, and type of activity can assist in moving toward a healthier lifestyle. The next section will explore how to begin implementing PA, and the benefits from small amounts.

Physical Inactivity as a Risk Factor

One of the key guidelines for PA, move more and sit less, involves increasing levels of PA (USDHHS, 2018). Approximately 7.7 hours of the day are spent sedentary in US adults and children (USHHS, 2018). There is a strong positive relationship between the time spent sedentary and cardiovascular disease (USDHHS, 2018). Sedentary behavior is defined by low energy expenditure while sitting, reclining, or lying (USDHHS, 2018). In an effort to reduce this behavior, this key guideline was developed. However, those who are sedentary many not be acclimated to any type of PA. Those who may not be conditioned for activity should consult their healthcare provider before beginning, especially if they have a chronic condition (USDHHS, 2018). The guidelines for safe PA recommend to "start low and go slow," meaning low intensity while gradually increasing frequency and rate (USDHHS, 2018). It is important to choose PA that is appropriate, safe, and while understanding risks (USDHHS, 2018). Even if proper time guidelines are not met, small increases in PA can provide health benefits and decrease risk factors. The USDHHS (2018) states that "some is better than none" in regard to PA. Scholars in the exercise physiology dimension also include that too much sitting, which is the most common sedentary behavior of adults, can become a distinct health hazard by increasing the risk for CVD among other risk factors (Hamilton, Healy,

Dunstan, Zderic, and Owen, 2008). This research suggests to break-up sedentary time and/or reduce overall sedentary time by small, light activities such as standing or taking random steps to "reset" the metabolic system (Hamilton et al., 2008). Finally, the importance of breaking up sedentary behavior is highlighted by how 30 minutes of exercise can be "undone" if one remains sedentary for most of the day (such as 15.5 hours) (Hamilton et al., 2008). These key pieces of information are helpful for healthcare professionals to remember when counseling their patients on the benefits of physical activity. In order to have a complete picture of health role-modeling, physical activity in healthcare professionals will be discussed in the following section.

Physical Activity in Healthcare Professionals

Research has suggested that healthcare professionals (HCPs) that are active are more likely to provide credible, more motivating, and preventative healthcare to their patients (Lobelo and de Quevedo, 2014; Oberg and Frank, 2009). However, many factors can inhibit this such as: lack of knowledge, low self-efficacy, time constraints within appointments, reimbursement, and most importantly, poor personal habits (Lobel and de Quevedo, 2014). Some evidence demonstrates physicians (unspecified specialties) lifestyle habits are better than the general population, but other healthcare professionals such as dieticians, physical therapists and non-specified exercise specialists have less evidence of healthy behaviors (Frank and Segura, 2009; Lobel and de Quevedo, 2014). An older study suggested that 60% of physicians exercised several days per week; however specific guidelines set forth by the USDHHS were not available at this time (Linn, yager, Cope, and Leake, 1986). Additionally, almost half of ATs (41%) met the former guidelines for PA in 2008 (30 minutes of moderate-intensity exercise per day) and

were more active than the general population, with only 7% of ATs being sedentary (Groth et al., 2008). These numbers can also be related to the how PA is defined, and the amount of physically taxing activities ATs must perform as part of job responsibility (Groth et al., 2008). Although numbers on HCPs performing PA is skewed, it is clear that it is necessary for personal health and to make a positive impact on their patients' health. In order to have a more objective view of measuring PA, tools to determine levels of PA will be discussed next.

Measuring Physical Activity

There are multiple physical activity questionnaires that ask a variety of questions. Some are short and to the point, asking how many times per week are spent doing a specific activity and for how long, others involve questions about rest time, or specific formulas to calculate level of activity. The World Health Organization (WHO) developed their own version, The Global Physical Activity Questionnaire, in order to get a global surveillance of physical activity (WHO, 2002). Although it is very thorough, involving four different sections with over 60 questions, it requires an extensive time for scoring and analysis (WHO, 2002). The International Physical Activity Questionnaire (IPAQ) is a shorter tool that measures intensity of PA and time spent sedentary (Booth, 2000). There are seven questions, with two or three sub-questions included within each of the seven (Booth, 2000). The questions broadly ask about the intensities of activity, as discussed in the USDHHS Guidelines for Physical activity, as well as questions regarding how sedentary one is. The current study bases its measurement of PA most closely to this questionnaire, due to its length, ease, and high reliability, (0.80). Another tool, the Godin Leisure-Time Questionnaire, is even shorter than the IPAQ, featuring only three

questions and a simple calculation to determine level of activity outside of work (Godin, 2011). It asks how many times during a typical week the individual follows the specific kinds of exercises greater than 15 minutes (Godin, 2011). Although though it does include a scoring guide, it does not consider how long after those 15 minutes are spent and can potentially mis-categorize an individual's PA level. It may have been useful for the previous guidelines for PA but falls short to the current. Conclusively, when measuring physical activity, it is important to have a specific research question in mind, or one can easily get lost. We will now continue onto a summary of this chapter in order to preface chapter III.

Summary

Though research has demonstrated that healthcare professionals who practice healthy behaviors such as eating correctly, keeping weight managed, practicing regular physical activity, avoiding tobacco products, and limiting consumption of alcohol, obesity levels continue to rise with over one-third of the US population affected by it (Oberg and Frank, 2009). Through this literature review, it was determined that proper nutrition and physical activity play the largest roles in their contribution to decreasing obesity. However, few healthcare professionals, specifically primary care physicians, are prescribing it as treatment. This could be related to their lack of knowledge, discomfort in the area, or lack of adherence from the patient.

An area with promising results for bettering health, but also filled with gaps, is health role-modeling. Health role-modeling involves the practice of healthy habits, behaviors, and baseline standard health of the healthcare provider in order to increase credibility and patient adherence to health practice (Oberg and Frank, 2009). It appears

that it would be a standard for healthcare providers to practice such behaviors, but research is sparse, especially within sports medicine professions such as athletic training. Current health role-modeling research of indicates that the role-modeling can significantly impact the provider's credibility as well as patient reception and adherence (Oberg and Frank, 2009). With 30% of the United States population being obese, researchers and healthcare providers are constantly searching for the most effective means of attainment and retention of health in their patients (CDC, 2020). Current standards in baseline health look to improve nutritional practices and increase activity levels in order to reduce the risk for heart disease, obesity, cancer, respiratory diseases, etc. as outlined by leaders among baseline health such as: The World Health Organization (WHO), American Heart Association (AHA), United States Department of Agriculture (USDA), United States Food and Drug Administration (FDA) and the American College of Sports Medicine (ACSM). Despite the overwhelming statistics and plethora of information regarding health role-modeling in the general population, there is little to no information regarding health behaviors of those that work with the physically active, such as athletic trainers and sports medicine specialized physicians. It can be hypothesized that these specific professions are generally healthy because of the population they work with. However, through amateur direct observation, this does not appear to be the case. In an effort to develop concrete evidence and then expectantly develop an implementation strategy, this research will complete a thorough exploration of health and health behaviors in athletic trainers and sports medicine specialized physicians. A quantitative approach, using the evidence from related professions and the general populations conferred above, will be discussed in chapter III.

CHAPTER III

METHODOLOGY

Research Design

The intent of this research is to have a greater understanding of health behaviors of Athletic Trainers (ATs) and the influence of these behaviors on their ability to perform work. The research questions are as follows:

1. Is there a difference in BMI, PA, and nutrition by gender, years certified, setting, and by region?
2. Is there a difference in dieting behavior between by gender, years certified, setting, and by region? Do disordered eating patterns relate with this behavior?
3. Is there a difference in working ability, predicted through BMI, by gender, years certified, setting, region, and type of work?

This research design was quantitative in nature, which involved two variations of the same survey to ATs through the National Athletic Trainers' Association (NATA). Specific inclusionary and exclusionary criteria are detailed below. Respondents were asked to discontinue the survey if criteria were not met.

Participants

Athletic trainers in the United States with active credentials were chosen as the populations of study due to the primary investigator's (PI) background in sports medicine and the current lack of health role modeling research in the population. The PI has been a certified AT since 2012, worked in a variety of clinical sports medicine settings, and has been able to make direct observations of the mostly unhealthy eating and physical activity patterns in both populations. Though there is an abundance of empirical research evidence regarding health behaviors of primary care physicians, nurses, medical students, only anecdotal evidence is available for the ATs (Oberg and Frank, 2009). The best way to reach ATs and determine their health habits is through the population's respective organization. The National Athletic Trainers Association (NATA) holds the largest collective membership of ATs and has various resources to connect researchers to the clinician population. Although it is not a requirement for ATs to become a member of the NATA, it is highly encouraged. Accessing this data base was chosen due to access and ease as the PI is a member of the NATA. Inclusion criteria is as follows. Participants must be active NATA members in a clinical role; retired and/or non-practicing ATs will be asked to discontinue the survey.

Additionally, exclusion criteria limits participation if one's health status is not normally functioning. Normally functioning is defined by having optimal health status, either free of conditions that significantly alter health status, or a condition in which dietary patterns, physical activity, work ability, and weight are stably controlled. For example, conditions that could exclude participation include thyroid disorders, selective cancers, uncontrolled diabetes, uncontrolled Crohn's disease, etc. Those who are

currently pregnant were asked to discontinue the survey as well. If "no" is selected for active credentials and/or normally functioning, the participant will be taken to a "thank-you for participating" page at the end of the survey via Skip Logic through Qualtrics programming.

Recruitment Process

The NATA has over 45,000 active members. However, after the first 1000 members recruited, a 15-cent fee is included on each potential participant. Because of this, a maximum of 2500 members were solicited for survey response. The NATA's current response percentage ranges from 10-13%. Thus, the researcher targeted 250 responses.

Pilot Study.

Prior to the national distribution of survey, a pilot study was distributed to a maximum of 7500 ATs through the NATA in order to determine reliability of selected scales, as well as comprehension from the reader's perspective. In order to reach NATA members for research purposes, the PI used the NATA's research service center. Access is provided to NATA members. Members interested in completing research through the NATA need to submit a request through the members only section of the website, detailing the nature of the study, where the study will be conducted, funding, and IRB approval documents. The researcher can be selective in their study, by requesting certain states, districts, member type, and/or work setting as well as length of time for survey distribution. Selection, along with creation of the survey is completed through NATA's Qualtrics account. When approved, the NATA sent out the solicitation email and reminders on behalf of the researcher through an e-blast. Following completion of data collection, the PI received the data from the NATA. The data will be kept on a secure

NATA server for a maximum of seven years. This survey service does come with a cost; for graduate students, the first 1,000 potential participants are free to survey, after the first 1,000, the cost is $0.15 per potential participant. The PI spent approximately $1250 on the entire study, including the pilot study. Funding was provided through the PI's scholarship award from the Middle American Athletic Trainers Association (MAATA).

Athletic trainers used in the pilot study were separate than ATs used in the main study. To keep the sample populations for each study similar, the pilot used ATs with the last name starting with the letter "A," continue through alpha order until 7500 ATs have been selected. Survey distribution criteria through the NATA was the same process as stated above. Once pilot analysis was completed, the PI submitted research requests to the NATA for the main study to be executed as it is detailed in the section above.

Main Study.

The same process for recruitment of ATs through the NATA was used for the main study. A new request was submitted, and the PI need to have the study approved by the NATA. Once approved, the NATA continued with the same distribution criteria. To keep this main study's population separate from the pilot study, the main study's sample started where the pilot study ended in the alphabet, in terms of last names. The number of potential participants was maximized at 2500 for this study, as stated above.

Data was collected in fall of 2020. Survey responses were solicited through email to members of the NATA. The survey was closed after eight weeks of data collection, on December 1.

Variables

In an effort to gain a holistic view of health in ATs, this survey featured a number of tools to properly identify health behaviors. It utilized measures and questions from previously validated surveys as well as additional project specific questions. Questions in the survey involve the five variables discussed above: body mass, nutrition, work ability, disordered eating, and physical activity. Additionally, demographic questions involving gender, age, height and weight (to determine BMI), work setting, number of years' board certified, average income, average amount of hours spent working per week, and region of residence were included.

Body Mass.

Body mass is determined through the Body Mass Index, which is a measure of height and weight that is then classified based on a calculation of each (Garabed, 2008). Originally developed in 1832 by Quetelet, it contains a mathematical formula with use of anthropometric height and weight to determine body mass classifications.

$$\text{(body weight, kilograms)} / \text{(body height, meters}^2\text{)}$$

Respondents were asked their height in inches, and weight in pounds through a series of three questions in the demographics section of the survey. The numbers were then converted to their metric measurements in order to properly calculate BMI. From there, the BMI number calculated determined if the individual is underweight, normal, overweight, and obese, based on the index. Table 3.1 exemplifies each category.

Table 3.1

BMI Index

BMI Number	BMI Classification
< 18.5	Underweight
18.5-24.9	Normal
25-29.9	Overweight
>30	Obese

As described in Chapter II, The Body Mass index (BMI) is not the most reliable measure of determining body mass due to its lack of differentiation between muscle and fat, but it is the most efficient and cost-effective way to determine body mass in large populations (CDC, 2020). Based on a meta-analysis of over 30 studies, it has a sensitivity of 50% and specific of 90%, (Okorodudu et al., 2010). The test-retest stability indicates a Cronbach's alpha of 0.995 and Kappa statistic of 0.895 (Hart, 2017).

Nutrition.

Nutrition formed the largest part of the literature review, and therefore is the largest portion of the survey. The Dietary Habits and Nutritional Beliefs Questionnaire for people 15-65 years old was modified and used for the basis of nutrition (Jezewska-Zchowicz et al., 2018). The KomPAN is a food frequency questionnaire that assesses dietary habits, food frequency consumption, nutrition beliefs, and lifestyle and personal data that can be administered in-person as an interview, or self-administered (Jezewska-Zchowicz et al., 2018). The questionnaire was developed in order to consolidate the work of many researchers and develop a nationwide standardization for nutritional habits (Jezewska-Zchowicz et al., 2018). The original survey contains four different sections: dietary habits (15 items), frequency of food consumption (32 items), nutrition beliefs (24

items), and lifestyle and personal data (31 items) (Jezewska-Zchowicz et al., 2018). The authors of the KomPAN state openly on their tool that they give the researchers the ability to modify the structure to best fit knowledge and science-based evidence. An email correspondence, which gave the PI permission to modify the KomPAN, is included in the appendix.

Though the KomPAN is a Polish tool, its questions are equivalent to most American guidelines for nutrition; those that did not meet equivalencies were modified or removed. In order to best fit the present study's research questions, nutrition beliefs was omitted, as the section does not relate to the present study. Although learning nutritional beliefs could enrich the study, the research questions do not focus on beliefs or nutritional knowledge. Additionally, leaving the nutritional beliefs section would have created a longer survey, potentially decreasing response rate due to respondent fatigue (Van Mol, 2017). The following table (Table 3.2) explains the numbers of items in the original survey, the number used in original form, the number modified, and the number excluded.

Table 3.2

KomPAN Modifications

Section	Original Survey	Used without modification	Used with modification	Not used	Items created	Total Current Items
Dietary Habits	15	2	8	5	2	12
Food Frequency	32	21	7	4	2	30
Nutrition Beliefs	24	0	0	0	0	0
Lifestyle Data	31	3	5	21	5	13

The dietary habits section is the first section the respondent encounters. It does not contain a subscale. The main purpose of this section, as it relates to the present study,

is to gather information on basic the dietary habits determine habits of each respondent. Responses will be used for descriptive statistics rather than scale measurement. Of the original 15 items, 10 were retained, and 2 new questions were added. Three of the original questions contained a single answer and were modified into allowing the respondent to select multiple answers (Questions 9, 11, 15 on the current survey). The two questions added are: Q6, How would you describe our eating pace compared to others, and Q7, On average, how many times per week do you eat breakfast? They were added in relation to the sections regarding eating pace and meal frequency in chapter 2.

The frequency of food consumption section follows dietary habits. Of the original 32 items, 28 items were retained, and 22 of those retained were modified to better fit American terminology and the USDHHS's Guidelines for Healthy Eating. Two additional questions were added in order to better fit the USDHHS's Guidelines for Healthy Eating. This section contains two different subscales: the healthy diet index, and non-healthy diet index. The healthy index (Table 3.3) is a selection of 10 different questions, and the non-healthy index contains 14 questions (Table 3.4). The remaining six questions serve to better understand one's diet. Modifications, based on the USDHHS's Guideline's to Healthy Eating, of each index are demonstrated in each table below.

Table 3.3

Healthy Diet Index (based on Main study)

Original Item Number	Original Item	Current Item Number	Modified Item
23	Whole wheat bread products	18	
25	Whole grain pasta, rice, oats	20	
31	Milk	25	
32	Fermented milk	27	Healthy Fats
33	Fresh cheese products	34	Starchy Vegetables
37	White meat	30	
38	Fish	31	
40	Plant-based protein foods	33	
42	Fruit	35	
43	Vegetables	36	

Table 3.4

Non-Healthy Diet Index (based on Main study)

Original Item Number	Original Item	Current Item Number	Modified Item
22	White bread products	17	
24	White rice, white pasta	19	
26	Fast foods	21	
27	Fried foods	22	
28	Bread spreads	23	
29	Lard spreads	24	Mayonnaise items
34	Cheese	26	
35	Cured meat	28	
36	Red meat	29	
44	Sweets	37	
46	Processed foods	38	
51	Sweetened beverages	41	
52	Energy drinks	44	
54	Alcoholic beverages	46	

The index categorizations are determined by coding of the answers to the items in this section. Respondents can select one of the following choices in Table 3.5 for each item in the food frequency section.

Table 3.5

Food Frequency Coding

Frequency	Scoring for categories	Daily Frequency (Times/day)
Never	1	0
1-3 times per month	2	0.06
Once per week	3	0.14
Few Times per week	4	0.5
Once per day	5	1
Few Times per day	6	2

Once all the items for both indexes are coded and summed based on each index, they are categorized by intensity and level of health (Table 3.6). The index with the greater score indicates the intensity of beneficial or harmful characteristics of diet (Jezewska-Zchowicz et al., 2018). Intensity in this case refers to the affinity of that level of diet. For example if healthy diet had a low intensity and unhealthy diet had a medium intensity, a greater affinity for an unhealthy diet is demonstrated.

Table 3.6

Intensity Level of Healthy versus Unhealthy Diet

Intensity	Range (times/day)		Range (points)	
	Healthy	Non-healthy	Healthy	Non-healthy
Low	0-6.66	0-9.33	0-33	0-33
Medium	6.67-13.33	9.34-18.66	34-66	34-66
High	13.34-20	18.67-28	67-100	67-100

Lifestyle and personal data follow frequency of food consumption in the present study. Most of the items from lifestyle and personal data were removed from the present study as they did not contribute to the main research purpose. Thirteen questions compose this section, with only three of the original questions retained, without modification. Most questions were modified in order to have a greater fit to the present study's purpose and included in the survey. For example, a question asking types of diets the respondent has been on, length of diet, weight loss, and if the weight loss was retained and were all added to fit the current research purpose.

Kowalkowska et al., (2018) determined reproducibility of the study using Kappa statistics for the interview version (IAQ), self-administered healthy people (SAQH), and self-administered outpatient (SAQO) populations of this questionnaire. The researchers concluded that kappa values above 0.40 were acceptable agreement. Table 3.7 indicates kappa scores for selected questions (based on use in the present study) of category of SAQH. The SAQH category was chosen to display as it relates most closely to the present study's populations.

Table 3.7

Kappa Statistics For Test And Retest Reliability Of KomPAN (Kowalkowska et al, 2018)

Item	SAQH
Dietary Habits	
meat-don't eat	0.79
sweetening hot beverages	0.88
bread spread	0.78
still water	0.84
grilled meat	0.76
sparkling water	0.8
dairy beverages-fat content	0.75
fruit snacking	0.82
type of water-flavored	0.71

type of frying fat	0.69
number of meals per day	0.74
adding salt to meals	0.79
type of water-don't drink	0.72
sweet snacks	0.68
savory snacks	0.67
snacks-nuts and seeds	0.67
stewed meat	0.77
meal consumption regularity	0.73
snacks-unsweetened dairy beverages	0.62
boiled meat	0.7
snacks-vegetables	0.66
roasted meat	0.69
snacking frequency	0.62
snacks-sweetened dairy beverages	0.58
fried meat	0.69
Food Frequency Consumption	
energy drinks	0.74
alcoholic beverages	0.78
canned meat	0.7
lard	0.68
potatoes	0.69
fruit	0.62
fast foods	0.69
fish	0.67
sweetened beverages	0.71
vegetables	0.59
instant soups	0.7
water	0.63
sweetened hot beverages	0.67
butter	0.6
whole meal bread	0.66
buckwheat, oats, wholegrain pasta	0.59
red meat	0.65
vegetable juices	0.6
eggs	0.63
white meat	0.63
white rice, white pasta	0.58
fermented milk beverages	0.6
cheese	0.62

pulses-based foods (plant-based protein)	0.62
vegetable oils, margarine	0.55
milk	0.61
fresh cheese products	0.6
white bread	0.61
sweets	0.62
fried foods	0.62
canned vegetables	0.56
fruit juices	0.61
deli meats, sausages	0.61
Lifestyle	
following a diet	0.76
self-assessment of health status	0.79
physical activity of work/school	0.76
eating out	0.71
self-assessment nutrition knowledge	0.72
self-assessment of diet	0.77
physical activity at leisure time	0.77

The following outlines internal reliability (using the kappa statistic) for self-administered of healthy people (SAQH) for each section of the index used for the present study: healthy diet index: 0.71, non-healthy diet index 0.58 (Jezewska-Zchowicz et al., 2018). Kappa statistics for all food items were greater than 0.50 (Kowalkowska et al., 2018). The cross-classification agreement of SAQH had a mean of 74.2% for food frequency, 87.5% for other dietary habits, and 87.4%, for lifestyle, (Kowalkowska et al., 2018). Overall, the instrument demonstrates good reproducibility based upon kappa statistics (Kowalkowska et al., 2018).

Disordered Eating.

Presence of eating disorders, or disordered eating in the case of this research, was determined through the Eating Disorder Examination Questionnaire, Short Form (Gideon, Hawkes, Mond, Saunders, Tchantuira, and Serprell, 2016). The Eating Disorder

Examination Questionnaire, Short Form (EDE-QS) is created from the Eating Disorder Examination Questionnaire (EDE-Q), which is originally derived from the Eating Disorder Examination (EDE) (Fairburn and Cooper, 1993). The original EDE was created in 1993, and has been considered the "gold standard" in eating disorder assessment of pathology (Gideon et al., 2016). It has since gone through six updates in order to stay relevant with the latest version of the DSM (Fairburn, Cooper, and O'Connor, 2014; APA, 2013). The EDE is an interview-based questionnaire, taking at least 45 minutes to complete with a patient. In an effort to decrease time, the EDE-Q was created to be shorter and self-report (Fairburn et al., 2014). However, it was still slightly cumbersome to patients, and required them to remember their symptoms over the past 28 days, creating a larger recall bias (Gideon et al., 2016). The EDE-QS was created in an effort to have a greater fit with appointments and have a lesser recall bias by reducing the reporting of symptoms to the last 7 days (Gideon et al., 2016). The EDE-QS was chosen for the present study due to is brevity and excellent reliability for detection of eating disorders and validity with its predecessors.

The EDE-QS is a 12-item questionnaire with a Likert-type response rating response scale of 0 to 3. It is marked by 0 being 0 days of symptoms in the past 7 days, 1 and 3 being 6-7 days of symptoms in the past 7 days. The last two questions use the same 0 to 3 response scale but are marked with 0 as "not at all" and 3 as "significantly" (Gideon et al., 2016). The entire 12-item questionnaire will be used for the present study. The only modification was adding a response of "prefer not to respond" to the Likert-scale, for greater safety and anonymity for respondents. Table 3.8 demonstrates coding and scoring.

Table 3.8

Likert Responses and Scoring of EDE-QS

Number of days	Response	Score
0	0	0
1 to 2	1	1
3 to 5	2	2
6 to 7	3	3
no response	0	0

The EDE-QS's scoring is based on the EDE and EDE-Q. The data from the EDE and EDE-Q provides two different types of data. The first type indicates frequency of behaviors and key behavioral features in eating disorders (Fairburn et al., 2014). The second is to determine the types of psychopathology and severity of specific eating disorders (Fairburn et al., 2014). This is determined through four different subscales: restraint (5 items), eating concern (5 items), shape concern (8 items), and weight concern (5 items) (Fairburn et al., 2014). The EDE-QS retains similar items: with 2 items for each subscale. The remaining 5 items on the EDE-QS coincide with other eating disorder behaviors as demonstrated in the EDE, as determined by the PI. Table 3.9 demonstrates subscales and table 3.10 demonstrates the remaining questions' associated behaviors.

Table 3.9

EDE-QS Subscales

Subscale	Item number
Restraint	1, 2
Eating Concern	3, 9
Shape Concern	8, 10
Weight Concern	8, 12

Table 3.10

EDE-QS Remaining Questions

Behavior	Item Number
Purging	7, 8
Overeating	9, 10
Body Image	11
Body Dissatisfaction	12

The EDE-QS shows excellent reliability in testing for the five eating disorders listed in the DSM-5 (Gideon et al., 2016). It has an internal reliability of 0.913 and shows high validity with the EDE-Q (Gideon et al., 2016).

Work Ability.

Two questions from the Work Ability Index were used to determine work ability in its relation to body mass and therefore obesity (Ilmarien and Tuomi, 1992). The Work Ability Index (WAI) is a questionnaire used to determine work ability in its relation to health in the workplace (Ilmarien and Tuomi, 1992). It is a seven-item index using various number ranges for scoring (Ilmarien and Tuomi, 1992). Table 3.11 demonstrates the variations.

Table 3.11

WAI Item Subscales and Responses

Item	Number of Subscales	Response	Range of responses
1	0	Rating	0 to 10
2	2	Likert	1 to 5
3	14	Rating	1, 2
4	0	Likert	1 to 6
5	0	Likert	1 to 5
6	0	Likert	1, 4, 7
7	3	Likert	0 to 4

It has demonstrated good reliability for in detection of decreasing work ability, and therefore can assist in selecting preventative measures increasing work ability (Ilmarien and Tuomi, 1992). Additionally, it has been used as a tool to determine how beneficial interventional effects have been in occupational health (de Zwart, Frings-Dresen, and van Duivenbooden, 2002). A recent study demonstrated that those who completed greater than five hours of high-intensity physical activity during leisure time, had a greater level of work-ability in comparison of those who did not perform such activities (Calatayud, Jakobsen, Sundstrup, Casana, and Andersen, 2015). Andersen, Izquierdo, and Sundstrup (2017) established that a greater BMI leads to a lower level of workability.

As demonstrated above, this index contains many different facets that fully encompass workability. However, in effort to keep to the purpose of the study and contain brevity, the present study is using item 2 from the WAI. Andersen, Izquierdo, and Sundstrup's (2017) research that relates work ability and obesity is the basis for using this two-item shortened version of the WAI. The two items looked at physical demands of the job and the mental demands of the job (Anderson et al., 2017). These questions use a Likert-scale to rate work ability from 1 "very poor", to 5 "very good" (Ilmarien and Tuomi, 1992). It has been tested for reliability and validity since its original inception; one of the most current reliability scores is 0.78 (Adel, Akbar, and Ehsan, 2019). Future studies on interventional effects on occupation health in ATs and SMSPs could investigate the use of the full WAI.

Physical Activity.

Physical activity was assessed through a series of questions based on the 2018 physical activity guidelines set forth by the USDHHS. The physical activity section of the survey utilized the International Physical Activity Questionnaire (IPAQ) as a basis for these questions (Booth, 2000).

The IPAQ is a tool that is used to obtain data on PA and ideally compare it internationally (Booth, 2000). It is a 7-item tool that asks the number of days, hours, and minutes a specific level of activity was completed in the past seven days (Booth, 2000). The questions are open ended, without a specific duration in mind. It has an acceptable test-retest reliability of $\rho = 0.75$ and $\rho = 0.30$ for validity (Craig et al, 2003). Though it is more autonomous, it includes items that are not necessary, such as sedentary behavior, for the present study. Because there was not a tool that met criteria specific enough for the present study, the PI created an instrument based off the IPAQ. The process is detailed in the following section.

To appropriately assesses physical activity (PA), a section in the current survey asked how many times per week the individual participates in PA in terms of vigorous, moderate, or light. It then asked the average amount of minutes spent doing that intensity of activity. Current activity levels were based off current PA guidelines set forth by the USDHHS (USDHHS, 2018). Current PA activity guidelines state to complete at least 150 minutes of moderate PA or at least 75 minutes of vigorous in a 7-day period (USDHHS, 2018). It is suggested to complete 3 days of aerobic activity, and 2 days of strength activity per week (USDHHS, 2018). Having a minimum of 30 minutes per day of moderate strength or aerobic activity will meet current guidelines of 150 minutes

moderate PA (USDHHS, 2018). Based on this, the respondents selected the number of times, respective to each category of intensity, they complete PA per week. This number was multiplied by the average number of minutes per week the respondent selects for specific intensity. Scores were based upon a summed total number from minutes in each activity level. Active is considered meeting the guidelines of 150 to 300 minutes of moderate intensity or 75-150 vigorous intensity per week (USDHHS, 2018). Highly active is surpassing 300 minutes of moderate intensity or 150 minutes of vigorous intensity per week. It should be noted that two minutes of moderate intensity equal one minute of vigorous intensity; this formula was used to ensure proper calculation of PA minutes (USDHHS, 2018). The following table (table 3.12) demonstrates classifications of physical activity. A discussion of how PA data, and all other instrument data will be analyzed is detailed in the upcoming section.

Table 3.12

Classification of Physical Activity Level

Activity Level	Minutes Per Week
Inactive	Light PA-little to none
Insufficiently Active	Mod to vigorous PA-does not meet recommended number of minutes
Active	Meets guidelines
Highly Active	Surpasses guidelines

Analysis

Survey data was entered into IBM SPSS 24.0 for analysis. Before the main survey was analyzed, a reliability analysis, using Cronbach's alpha was used to observe how reliable selected instruments were. This included food frequency and disordered eating. A principle components analysis (PCA) was used on question 50 (of the pilot study) to

reduce data. Principal axis factoring was used to extract the communalities. Due to the social science nature of the study, a promax oblique rotation was used detect correlations between factors and maximize the variance in order to reach the cleanest form of the data structure. In order to evaluate the appropriateness of this data, the following procedures were used: data is quantitative, data is linearly related, 10 subjects per item rule, Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (greater than 0.60), Bartlett's test of sphericity ($p < 0.05$), and the determinant of the correlation matrix is greater than 0, but less than 1. Factors were retained based on eigenvalues greater than one, scree plot, and parallel analysis. Additionally, a Cronbach's alpha was conducted to determine reliability of the data. Once the reliability analysis and PCA of question 50 were completed, and the survey was revised, the final survey was sent out to the main sample.

Once data were collected from the main study, analysis based on each question ensued. Table 3.13 highlights how each research question was analyzed.

Table 3.13

Research Question Analysis (Based on numbering of Main Study)

Research Question	Independent Variables	Source of IVs	Dependent Variables	Source of DVs	Analyses
1. Is there a difference in BMI, PA, and nutrition by gender, years certified, setting and by region?	Gender *Categorical* Years Certified *Categorical* Setting *Categorical* Region *Categorical*	Demographics section of survey	1. BMI *Continuous* 2. PA (total and classifications) *Continuous* 3. Healthy Eating *Continuous* 4. Unhealthy Eating *Continuous*	1. Body Mass Index (Questions 76, 77, 78) 2. Multiplying times per week by average number of minutes per PA intensity level (Questions 62-68) & determining classification 3. Healthy & Unhealthy diet indexes (Questions 17-31, 33, 35-38, 41, 44, 46, and Food Frequency Coding Scale)	28 separate CR ANOVAs
2.Is there a difference in dieting behavior between by gender, years certified, setting and by region? (1) *and do disordered eating patterns relate with this behavior? (2)*	Gender *Categorical* Years Certified *Categorical* Setting *Categorical* Region *Categorical*	Demographics section of survey	Dieting behavior *Categorical*	Dieting Questions (47,48, 50-52)	36 Chi Squares
(2) Do disordered eating patterns relate with this behavior?	Dieting Behavior *Categorical*	Dieting Questions (47, 48, 50-52)	1. EDE-QS Score Total *Categorical* 2. EDE-QS Subscales *Categorical*	Questions 60, & 61: EDE-QS total and subscales	25 Chi Squares
3. Is there a difference in working ability, predicted through BMI, by gender, years certified, setting, and by region?	Gender *Categorical* Years Certified *Categorical* Setting *Categorical* Region *Categorical* BMI *Continuous* Type of Work (Q70) *Categorial*	Demographics section of survey BMI Classification, Questions 76-78	Work Ability *Categorical*	Work Ability Questions 71-72	Ordinal Logistic Regression

For the first research question, four categorical variables, gender, years certified, setting, and region were used to investigate specific health behaviors, outlined in Table 3.12. Four separate one-way of analysis of variance (ANOVA) measured BMI, PA, and diet pattern (healthy and unhealthy indexes) for each independent variable. For each

ANOVA, assumptions were checked to ensure the F statistic was robust: no outliers, homogeneity of variance, independent observations, and normal distribution of data. If any were violated, modifications such as removal of outliers and Kruskal-Wallis Tests were used. An alpha value of 0.05 was used to control significance.

The second question was divided into two separate parts. The first part investigated the differences in dieting behavior observed in gender, years certified, setting, and region. These were the independent variables and dieting behavior (in their relation to weight loss) questions 47, 48, 50-52, all categorical variables, as the dependent variables. If respondents selected "no" to question 48, *Have you ever followed a diet?*, the remaining three questions relating to dieting behavior were skipped. In this case, data were coded as "no answer." Due to the categorical nature of the independent and dependent variables, Chi Square tests were conducted to determine differences. The second part of the question determined relation between dieting and eating disorder behavior. The second part of this question used a chi-square test to determine the relation between the dieting questions and the total EDE-QS score, and 4 separate subscales. The following assumptions for chi-square were checked to ensure robustness: levels of variables are mutually exclusive, contribution of data to only one cell, independence, value of cell expected should be more than 5 in all cells, no cell should have an expected value of less than one, and data in cells should be frequencies. Modifications, such as combining levels of data, were applied in the case that any assumptions were violated. An alpha value of 0.05 was used to control significance for each of these analyses.

The third question investigated if body mass classification based on BMI, gender, years certified, setting, region, and type of work, could predict working ability. Ordinal

logistic regression was used in order to determine predictability. BMI served as the continuous independent variable (covariate) and was used to predict work ability as a result of the answer to questions 70-72. The question contained two separate analyses: one for work ability on physical demands and the second for work ability on mental demands. With each analysis, 6 different models were used, with the first comparing gender, the second comparing years certified, the third comparing setting, the fourth comparing region, and the fifth is work demands (question 70). This research question is modeled after Andersen, Izquierdo, and Sundstrup's (2017) research on obesity in the general working population. Assumptions were checked in order to ensure robustness of data. They included: independence of observations, no multicollinearity between independent variables, independent variables linearly related to the log odds, and large sample size. Modifications, such as combining levels of variables, were applied to assist in decreasing violations. An alpha value of 0.05 was used to control significance. Results for analysis of all research questions are discussed in Chapter IV.

CHAPTER IV

FINDINGS

Pilot Study

Sample

The pilot study included a sample size of 672 collected through 4 solicitation emails from the NATA, after all inclusion criteria was met and missing data removed. Inclusion criteria included membership in the NATA, current active credentials, and normally functioning person. If any of the criteria were not met, the participant was not permitted further into the survey. Table 4.1 displays descriptive statistics for each of the demographic factors on a continuous scale. Table 4.2 displays coding and frequency of the categorical factors.

Table 4.1

Descriptive Statistics, Demographics

	N	Mean	Median	Mode	SD	Range	Min	Max
Age	670	35 .91	32.00	25.00	11.13	47.00	22.00	69.00
Height (ft)	670	5.18	5.00	5.00	0.40	2.00	4.00	6.00
Height (In)	665	5.66	6.00	4.00	3.24	11.00	0.00	11.00
Weight (lbs)	667	179.27	175.00	175.00	41.67	250.00	100.00	350.00
Yrs Cert	671	3.61	3.00	2.00	1.56	5.00	1.00	6.00
Avg Hrs/ Wk	669	46.61	45.00	40.00	11.75	100.00	0.00	100.00

Table 4.2

Coding and Frequency of Categorical Factors

Variable	Categories	Code	Frequency	Percent
Gender	Cisgender Male	1	262	39.00
	Cisgender Female	2	387	57.70
	Transgender Male	3	0	0.00
	Transgender Female	4	0	0.00
	Other	5	5	0.70
	Prefer not to respond	6	13	1.90
Career Setting	College/University	1	268	39.90
	Secondary School	2	237	35.30
	Clinic/Hospital	3	88	13.10
	Professional Sports	4	17	2.50
	Emerging Settings	5	45	6.70
	Other	6	16	2.40
Years Certified	Less than 1 year	1	4	0.60
	1-5	2	228	34.00
	6-10	3	150	22.40
	11-15	4	69	10.30
	16-20	5	83	12.40
	Greater than 20	6	137	20.40
Region of Residence	Northeast	1	159	23.70
	Southeast	2	175	26.10
	Midwest	3	169	25.20
	Southwest	4	58	8.60
	Rocky Mountains	5	32	4.80
	West Coast	6	71	10.60
	Alaska	7	0	0.00
	Hawaii	8	6	0.90
Average Annual Income (k)	0-20	1	20	3.00
	20-30	2	30	4.50
	30-40	3	96	14.30
	40-50	4	184	27.40
	50-60	5	140	20.90
	60-70	6	77	11.50
	70-80	7	53	7.90
	80-90	8	23	3.40
	90-100	9	19	2.80

	100-110	10	12	1.80
	110-120	11	5	0.70
	120-130	12	3	0.40
	130-140	13	3	0.40
	140-150	14	0	0.00
	150-160	15	1	0.10
	160-170	16	0	0.00
	170-180	17	1	0.10
	180-190	18	0	0.00
	190-200	19	0	0.00
	Greater than 200	20	3	0.40

Age, height weight, average income, and average amount of hours worked per week were selected through a dropdown menu. Gender, setting, years certified, and residential region were descriptive for each. Those that did not select an answer remained blank. Missing data was not a concern for demographic factors.

Reliability Analysis

In order to determine internal reliability of scales that measured a specific construct, a reliability analysis was completed to obtain a Cronbach's alpha. Of the six scales used in this study, two were identified for reliability analysis: The Food Frequency portion of the KomPAN dietary scale measured healthy versus unhealthy dietary intake, and the Eating Disorder Questionnaire, short form, measured the level of disordered eating present. The four other scales were used for item-level descriptive statistics, therefore a reliability analysis was not necessary. Data was analyzed in SPSS 24 for Windows. A discussion of each scale's reliability will follow.

Table 4.3

Reliability Analysis

Instrument	No. of Items	Specific Items	Response Type	Cronbach's Alpha
KomPAN Food Frequency	30	18-45, 48, 99	Binary	0.63
EDE-QS	11	Q 63_ 1-9, Q 64_1-2	Likert	0.82

Appropriate levels of Cronbach's Alpha reliability are greater than 0.60 (adequate), 0.70 (good), 0.80 (better), and 0.90 (best) (Bonett and Wright, 2014; Cronbach, 1951). The pilot KomPAN Food Frequency scale demonstrated adequate reliability, which indicates it is appropriate for further research purposes (George and Mallery, 2003). Specific items from the scale for the healthy and unhealthy diet indexes were used for the first research question, *Is there a difference in BMI, PA, and nutrition by gender, years certified, setting, and by region?*

The pilot administration of the EDE-QS demonstrated better reliability (0.82) and is consistent with previous research concerning reliability. A greater score on this scale indicates a greater tendency of disorder eating pattern and behavior. This scale is used for both portions of research question two: *Is there a difference in dieting behavior between by gender, years certified, setting, and by region? Do disordered eating patterns relate with this behavior?* One item was omitted from the pilot study on the EDE-QS but will be included for a total of 12 items for the main study. It is suspected that this will improve reliability.

The results of the reliability analyses provided the researcher with key pieces of information that assisted in the main outcome of the study with ensuring data is reliable. Additionally, through observation of the item responses, question 50 (current/previous weight loss diets) in the KomPAN Lifestyle and Personal scale, which has an immense amount of response choices (29) was transformed into 29 unique dichotomous items (selected or not selected). This set of dichotomized items was explored with principal components analysis (PCA). PCA is appropriate to reduce the amount of data in order for it to be more interpretable. The following section will explore PCA of question 50.

Principal Components Analysis, Question 50

Principal components analysis was used to determine the dimensional structure of the KomPAN Lifestyle and Personal scale data, to summarize the number of dichotomous items and reduce them into a smaller set of newer items (represented as components/factors) for question 50. It allows the data to be combined in a more observable and interpretable way. The following criteria were used to evaluate the appropriateness of this method: data is quantitative, data is linearly related, 10 subjects per item rule, Kaiser-Meyer-Olkin (KMO) Measure of sampling adequacy (greater than 0.60), Bartlett's test of sphericity ($p < 0.05$), and the determinant of the correlation matrix is greater than 0 but less than 1. Factors retained were determined by eigenvalues greater than one, parallel analysis and cumulative variance accounted for greater than 60%. Data were analyzed in SPSS 24 for Windows.

Each item of question 50 referred to a specific type of diet. Responses were dichotomous and categorical, where a response of "not selected" was coded as 1 and "selected" was coded as 2. Descriptive statistics of each item are displayed in Table 4.4. An initial PCA of the 29 dichotomized responses associated with the response options of question 50 was conducted using a promax oblique rotation. This method of rotation was chosen in order to allow factors to correlated. Before any interpretation, 3 items (50-12 [volumetrics diet], 50-13 [mind diet], and 50-14 [TLC diet]) were removed due to those items having zero variance from no respondents selecting these items, and correlation coefficients could not be computed for all pairs of variables, resulting in 26 items for PCA. The determinant of the correlation matrix was measured at 0.036, which is greater than zero, and less than one, which indicated there wer some correlations and factor analysis was warranted. Bartlett's test had a significance level of $p = 0.000$, which indicated a sufficient sample size. The KMO test had a measure of 0.615, which is almost considered "middling" measure, which indicated an acceptable measure for structure detection. This information denoted that the data were suitable for factor analysis procedures.

Table 4.4

Summary of Item Level Descriptive Statistics

Item	Diet	N	Frequency	Percent
Q50_28	Low cal	671	120	17.90
Q50_27	Low carb	671	119	17.70
Q50_18	Intermittent Fast	671	102	15.20
Q50_29	Other	671	89	13.30

Q50_26	Elimination	671	64	9.50
Q50_1	Keto	671	46	6.90
Q50_6	Whole 30	671	39	5.80
Q50_5	Paleo	671	38	5.70
Q50_21	Vegetarian	671	34	5.10
Q50_8	WW	671	31	4.60
Q50_24	Fast	671	26	3.90
Q50_20	Vegan	671	24	3.60
Q50_19	Mediterranean	671	17	2.50
Q50_9	Noom	671	13	1.90
Q50_2	Atkins	671	11	1.60
Q50_25	Juice Cleanse	671	9	1.30
Q50_4	Nutrisystem	671	8	1.20
Q50_10	South Beach	671	4	0.60
Q50_22	Raw food	671	4	0.60
Q50_23	Blood Type	671	4	0.60
Q50_7	Zone	671	3	0.40
Q50_3	Jenny Craig	671	2	0.30
Q50_15	Grapefruit	671	2	0.30
Q50_16	Cabbage	671	2	0.30
Q50_11	DASH	671	1	0.10
Q50_17	Blueprint	671	1	0.10
Q50_12	Volumetrics	671	0	0.00
Q50_13	Mind	671	0	0.00
Q50_14	TLC	671	0	0.00

Note. Frequency and Percent are based off of "selected" responses (not selected =1, selected = 2).

Decision to Retain Factors.

The initial decision to retain factors was chosen by number of eigenvalues greater than one, parallel analysis, more than one loading per factor, and because the study is in the field of social science, the researcher wanted to have enough factors to extract at least 60% variance. However, with each variation, the cumulative variance did not meet 60%. Three different models were conducted in

order to arrive at a factor solution that balanced plausibility and parsimony (Fabrigar, Wegener, MacCallum, and Strahan, 1999). This decision was guided by Costello and Osborne (2005) and Fabrigar et al. (1999) methodology stating the best practice for unclear data is to conduct a series of analyses. Thus, 8, 9, and 11-factor models were evaluated in order to determine which model would best explain the data. The eight-factor model was determined by parallel analysis but did not account for 60% variance. The nine-factor model was determined by the eigenvalues greater-than-one rule, but did not account for 60% variance, and the eleven-factor model was tested because the number of factors accounted for 60% of the variance, but exceeded the eigenvalues greater than one rule. Each model was evaluated by interpretability, clean-loadings greater than the absolute value of 0.3, and variance explained in the communalities.

Eight-Factor Model.

The eight-factor model was explored as a result of parallel analysis. Although eight eigenvalues greater than one were retained, the model accounted for 50.494% of the variance. This suggests that some items do not fit the model well. The number of residuals between the observed and reproduced correlations is 121, or 37% of non-redundant residuals with absolute values greater than 0.05. Because this value is less than half, there isn't a large concern for problematic items. All items loaded on at least one factor, with loadings ranging from the absolute value of 0.315 to 0.803. However, there were seven cross-loadings present, resulting in an un-clear interpretability. Factor loadings were not interpreted in this model because of this.

Nine-Factor Model.

The nine-factor model was explored due to nine eigenvalues having a value greater than one; it was the first solution observed. Parallel analysis and cumulative variance were not considered in this solution. Although all factors had eigenvalues greater than one, the solution accounted for 54.734% of the variance, which suggested that some items did not fit the model well. The number of residuals between the observed and reproduced correlations is the same as the eight-factor model (121, or 37%), suggesting data is not problematic. All items loaded on one factor with loadings ranging from the absolute value of 0.301 to 0.845, which suggested a greater fit. Four cross-loadings were still present with this data. Despite this, most of the factors were interpretable and clear.

Eleven-Factor Model.

The eleven-factor model was explored because it accounted for 62.204% of the variance, which suggested a greater fit of items to the model. However, not all eigenvalues were greater than or equal to 1. The number of residuals between the observed and reproduced correlations 120, or 36%, suggesting data is not problematic. This was the third solution obtained through observation of cumulative variance greater than 60%. All items loaded on at least one factor, with loadings ranging from the absolute value of 0.355 to 0.849. Four cross-loadings were observed. The solution was more clear than the other models due to the of the greater loading scores and decreased number of cross-loadings.

However, the 11th factor loaded only one item, which is not ideal for interpretation or accuracy.

PCA Discussion.

Through thorough observation of each model, it was determined that the nine-factor model best fit the data. Although none of the models met all criteria for decisions to retain factors, the researcher sensed the nine-factor model was the most appropriate due to its overall interpretability, clean loadings, met the eigenvalues greater than one rule, and had more than one item load on each factor. The factors reflected meaningful representation of the items and fit to the model well. Table 4.5 displays the loadings of each of the factors. The factors represent the following constructs: older commercialized diets, newer commercialized diets, cleanse-based diets, elimination diets, user-created diets, non-meat diets, heart-healthy diets, celebrity endorsed diets, and low glycemic index diets. In terms of cross-loading, the Ketogenic diet cross-loaded on elimination and low glycemic index. It fit more appropriately with low-glycemic index diets rather than elimination. Atkins diet cross-loaded on commercialized and celebrity endorsed diets but fit more appropriately with celebrity endorsed. Nutrisystem cross-loaded on commercialized and celebrity-endorsed diets but fit more appropriately with commercialized. The Zone diet cross-loaded on elimination diets and low glycemic index diets but fit more appropriately with low glycemic index diets.

Table 4.5

Pattern Matrix, Nine-Factor Model

	Older Comm	Newer Comm	Cleanse	Elim	User-Created	Non-meat	Celeb Endorsed	Heart Healthy	Low Glycemic
Noom	0.368	*	*	*	*	*	*	*	*
Nutrisystem	0.518	*	*	*	*	*	0.466	*	*
Atkins	0.521	*	*	*	*	*	-0.389	*	*
Cabbage	0.743	*	*	*	*	*	*	*	*
Jenny Craig	0.78	*	*	*	*	*	*	*	*
Grapefruit	0.805	*	*	*	*	*	*	*	*
South Beach	*	0.469	*	*	*	*	*	*	*
Raw food	*	0.785	*	*	*	*	*	*	*
Fast	*	0.603	*	*	*	*	*	*	*
Juice Cleanse	*	0.712	*	*	*	*	*	*	*
Blueprint	*	*	0.891	*	*	*	*	*	*
Mediterranean	*	*	0.301	*	*	*	*	0.702	*
Blood Type	*	*	0.767	*	*	*	*	*	*
Keto	*	*	*	0.32	*	*	*	*	-0.401
Paleo	*	*	*	0.77	*	*	*	*	*
Whole 30	*	*	*	0.81	*	*	*	*	*
zone	*	*	*	0.33	*	*	*	*	0.628
Elimination	*	*	*	0.32	*	*	*	*	*
Intermittent Fast	*	*	*	*	0.434	*	*	*	*
Low carb	*	*	*	*	0.712	*	*	*	*
Low cal	*	*	*	*	0.771	*	*	*	*
Vegan	*	*	*	*	*	0.845	*	*	*
Vegetarian	*	*	*	*	*	0.713	*	*	*
WW	*	*	*	*	*	*	0.774	*	*
DASH	*	*	*	*	*	*	*	0.79	*
Other	*	*	*	*	*	*	*	*	0.736

Table 4.6 represents the communalities and the overall variance extracted for each item. Their extracted variances are lower than expected possibly due to the lower

overall cumulative variance. Although this specific sub-scale is researcher-generated, specific to the current study, it could be useful for future weight loss-diet related research.

Table 4.6

Communalities

	Initial	Extraction
Blueprint	1	0.77
Blood Type	1	0.71
Jenny Craig	1	0.70
Vegan	1	0.68
Grapefruit	1	0.65
Whole 30	1	0.64
Vegetarian	1	0.64
DASH	1	0.63
Low-cal	1	0.62
Mediterranean	1	0.62
Paleo	1	0.60
Raw food	1	0.59
Low-carb	1	0.57
Cabbage	1	0.55
Other	1	0.54
WW	1	0.53
Ketogenic	1	0.52
Juice Cleanse	1	0.49
Nutrisystem	1	0.49
Atkins	1	0.48
Fast	1	0.43
Zone	1	0.43
Elimination	1	0.39
South Beach	1	0.38
Intermittent Fast	1	0.38
Noom	1	0.21

Pilot Study Discussion

Although the results of the pilot study were not as expected, there were multiple pieces of information that proved to be useful and extractable for the main study. First, the reliability measures for two scales were evaluated and demonstrated accurate results, providing a baseline for the main study. Second, data from item 50 were reduced and represented in a more meaningful way to interpret. For the main study, original items will be used in the survey, but will be discussed based on factor loadings. Third, many survey participants reached out to the researcher with various comments and suggestions for the main study. Suggestions included altered wording within the consent portion of the survey in order to create better flow, including pregnancy as an exclusionary criterion, and including "belief system" as a choice for choosing a diet (e.g. Veganism). Additionally, the numbering and font-type of the survey was not fluid and was corrected for the main study. The 12th item to the EDE-QS scale was also added to the main study. Once all adjustments were made, the main study was administered to the remaining NATA participants. As discussed in chapter three, NATA participants were selected via alpha order for the pilot study. The main study started where the pilot study ended in terms of alpha order with participants for there to be no repetition from pilot to main study. The main analysis will be discussed in the following section.

Main Study

Sample

The main study included a sample size of 265 respondents who met all inclusion criteria and responded to all items, collected through 4 solicitation emails from the NATA. A 10.60% response rate was calculated, based on the 2500 that were solicited. Inclusion criteria included membership in the NATA, current active credentials, and normally functioning person. If any of these criteria were not met, the participant was not permitted further into the survey. A total of 89 responses did not meet inclusion criteria or did not complete the full survey. Table 4.7 displays descriptive statistics for each of the demographic factors. Table 4.8 displays coding and frequency of categorical factors.

Table 4.7

Descriptive Statistics, Demographics

	N	Mean	Median	Mode	SD	Range	Min	Max
Age	265.00	34.61	31.00	26.00	9.95	48.00	23.00	71.00
BMI	265.00	27.13	25.83	21.14	5.70	34.16	16.27	50.43
Yrs Cert	265.00	2.52	2.00	1.00	1.56	5.00	0.00	6.00
Avg Hrs/ Wk	265.00	44.79	41.00	40.00	12.81	85.00	5.00	90.00

Table 4.8

Coding and Frequencies of Categorical Variables

Variable	Categories	Code	Frequency	Percent
Gender	Cisgender Male	1	96	36.20
	Cisgender Female	2	165	62.30
	Transgender Male	3	0	0.00
	Transgender Female	4	0	0.00

	Other	5	1	0.40
	Prefer not to respond	6	3	1.10
Career Setting	College/University	1	96	36.20
	Secondary School	2	96	36.20
	Clinic/Hospital	3	32	12.10
	Professional Sports	4	10	3.80
	Emerging Settings	5	16	6.00
	Other	6	15	5.70
Years Certified	Less than 1 year	1	1	0.40
	1-5 years	2	98	37.00
	6-10	3	64	24.20
	11-15	4	20	7.50
	16-20	5	29	10.90
	Greater than 20	6	53	20.00
Region of Residence	Northeast	1	76	28.70
	Southeast	2	68	25.70
	Midwest	3	71	26.80
	Southwest	4	16	6.00
	Rocky Mountains	5	9	3.40
	West Coast	6	25	9.40
	Alaska	7	0	0.00
	Hawaii	8	0	0.00
Average Annual Income (k)	0-20	1	8	3.00
	20-30	2	10	3.80
	30-40	3	41	15.50
	40-50	4	73	27.50
	50-60	5	62	23.40
	60-70	6	24	9.10
	70-80	7	17	6.40
	80-90	8	8	3.00
	90-100	9	6	2.30
	100-110	10	4	1.50
	110-120	11	2	0.80
	120-130	12	2	0.80
	130-140	13	3	1.10
	140-150	14	1	0.40
	150-160	15	1	0.40
	160-170	16	1	0.40
	170-180	17	0	0.00
	180-190	18	0	0.00

	190-200	19	0	0.00
	Greater than 200	20	2	0.80

Age, height weight, average income, and average amount of hours worked per week were selected through a dropdown menu. BMI was calculated by summing total height, converting to meters and squaring each, as well as summing weight and converting to kilograms. The formula: (body weight, kilograms) / (body height, meters^2) was used to calculate BMI. Gender, setting, years certified, and residential region were descriptive for each. Those that did not select an answer remained blank and were removed.

Research Question 1

The first research question stated, "*Is a difference in Body Mass Index (BMI), physical activity (PA), and nutrition by gender, years certified, setting, and region?"* The dependent variables (in bold) are as follows: 1. **BMI** (Questions 76, 77, 78), 2. Multiplying bouts of PA per week by average number of minutes per PA intensity level (Questions 62-68) and determining PA intensity (**light, moderate, and vigorous, and activity level** (based on summing of moderate and vigorous intensities). 3. **Healthy** and **Unhealthy Diet Indexes** (Questions 17-31, 33, 35-38, 41, 44, 46, and Food Frequency Coding Scale). A one-way analysis of variance (ANOVA) was conducted for each independent variable on each dependent variable, which resulted in 28 separate ANOVAs. All IVs were independent of DVs. Before conducting each ANOVA, outliers were determined in each of the dependent variables by a Z-score value (standardized residuals) greater than the absolute value of 2.5 and were removed from the data. The

assumptions of homogeneity of variance and normality were assessed with each ANOVA as well. Because normality and homogeneity of variance were violated for all conditions, Kruskal-Wallis tests, represented by a chi-square statistic (X^2), were used as modifications.

Two analyses yielded significant results: the effect of gender on BMI, X^2 (3) = 12.06, $p < 0.05$, and the effect of setting on light activity, X^2 (5) = 16.37, $p < 0.05$. Years certified, nor region yielded any significant results with any of the dependent variables.

A Games-Howell test was used for post hoc testing due to violation of normality and homogeneity of variance, and greater power. The Games-Howell test is best used with unequal variances to increase power, but at the expense of having a greater type 1 error rate. The effect of gender on BMI demonstrated significant differences with cisgender males and cisgender females, MD = 1.64, $p < 0.05$. Cisgender males were more likely to have a greater BMI than cisgender females. The effect of career setting on light activity did not demonstrate any significant differences in post hoc testing, however. This may be attributed to a lack of statistical power from small group sizes, where college/university and secondary school have large group sizes (both N=96), and the remaining have 30 or less in each group. This unequal group size effect can reduce power. Additionally, there are a large number of factor levels (6), which may have also contributed to decreasing power.

Research Question 2-A

The first part of research question 2 stated, "*Is there a difference in dieting behavior for those of different gender, years certified, setting, and region?"* The dependent variables were five different dieting behavior questions, 47, 48, 50-52. Chi-square tests were conducted for each independent variable with each of the dependent variables. For all of the variable combinations, the expected cell counts were less than 5 in all outcomes. As a modification, data were combined and/or reduced for results to be viable. The following IVs were combined. For gender, responses of "other" or "prefer not to respond" were removed (no responses were recorded for transgender male or transgender female). For years certified, groups "11-15" and "16-20" were combined, which is now represented by "11-20 years certified." For region, the categories "West Coast" and "Rocky Mountains" were combined to represent "West", and "Southwest" and "Midwest" were combined to represent "Midwest." There were no responses from Alaska or Hawaii, therefore they were removed. For dependent variables, questions 47 (are you currently on a weight-loss diet) and 48 (have you ever followed a weight-loss diet), the original responses were: "no," "yes, for personal reasons," "yes, doctor advised for weight loss," "yes, doctor advised for medical condition," and "no, due to my belief system (such as veganism or religion). The response of "no, due to my beliefs" was combined with "no," which is now represented by "no diet." Additionally, the responses of "Doctor advised for weight loss" and "Doctor advised for medical condition" were combined with "personal reasons," which is now represented by "diet." For question 50, "how long did you diet for?" the first

4 responses, representing “less than a month” up to “9-12 months” were combined to represent “less than or equal to 1 year.” For question 52 “How long did you keep the weight off?” the first 4 responses, representing “1-3 months” up to “9-12 months” were combined to represent “less than or equal to 1 year”, and responses 5 and 6, representing 1-3 years were combined with 7, now represented by “greater than 1 year.” A total of 2 chi-square tests met all assumptions and demonstrated significance, Question 48 and gender, $X^2(1) = 4.96$, $p < 0.05$. and question 52 and years certified, $X^2(6) = 22.10$, $p < 0.05$. The crosstabs are displayed in Table 4.9 and 4.10, respectively.

Table 4.9

Cross Tabs, Question 48 and Gender

		Gender		
Question 48		CisMale	CisFemale	Total
No Diet	Count	49.00	62.00	111
	Expected Count	40.80	70.20	111
	Adjusted Residual	**2.20**	-2.20	
Diet	Count	36.00	84.00	120
	Expected Count	44.20	75.80	120
	Adjusted Residual	-2.20	**2.20**	
Total	Count	85.00	146.00	231
	Expected Count	85.00	146.00	231

Note. Question 48 reads, “Have you ever dieted?”

Based on the adjusted residuals, males were more likely to not have followed any weight-loss diet, and females were more likely to have followed a weight-loss diet in their lifetime.

Table 4.10

Cross Tabs, Question 52 and Years Certified

		Years Certified				
Question 52		1-5	6-10	11-20	> 20	Total
No Diet	Count	48.00	37.00	25.00	18.00	128
	Expected Count	44.90	31.60	24.90	26.60	128
	Adjusted Residual	0.90	1.70	0.00	-2.80	
Less Than or Equal to 1 Year	Count	23.00	16.00	10.00	11.00	60
	Expected Count	21.00	14.80	11.70	12.50	60
	Adjusted Residual	0.60	0.40	-0.60	-0.50	
Greater than 1 Year	Count	10.00	4.00	10.00	19.00	43
	Expected Count	15.10	10.60	8.40	8.90	43
	Adjusted Residual	-1.80	**-2.60**	0.70	**4.20**	
Total	Count	81.00	57.00	45.00	48.00	231
	Expected Count	81.00	57.00	45.00	48.00	231

Note. Question 52 reads, "How long did you keep the weight off [from dieting]?"

The responses of "no diet" and "greater than 20 years" demonstrated a significant result, but were inappropriate for interpretation, as the question relates to directly to weight loss from a weight-loss diet. The remaining two significant outcomes were appropriate for interpretation and discussion. Those that are certified for 6-10 years were less likely to keep weight off, for greater than 1 year, and those who were certified greater than 20 years were more likely to keep weight off for greater than 1 year.

It is important to discuss that although Question 51 did demonstrate significance with gender, it had one cell that had an expected count less than 5, and therefore violated the assumptions. Upon combining and reducing variables, the results were non-significant. Because of this, Question 51 and gender is not appropriate for discussion. A discussion of the significant variables will continue in chapter 5.

Research Question 2-B

The second half of research question 2 states, are disordered eating patterns related to dieting behavior. A chi-square test was used to determine the relation between weight-loss dieting and disordered eating. For all of the variable combinations, the expected cell counts were less than 5 in all outcomes. As a modification, data were combined and/or reduced for results to be viable. The same data reductions from research question 2a, using the dieting questions were used for this analysis. The "total score" for the EDE-QS was the only outcome used for disordered eating and transformed into a categorical variable by grouping similar scores together, 0, 1-5, 6-10, and 11-20. A total of three chi-square tests demonstrated statistically significant results, satisfying all assumptions, Question 47 and total score, $X^2(3) = 15.28$, $p < 0.05$; Question 48, total score, $X^2(3) = 51.57$, $p < 0.05$; and Question 52 and total score, $X^2(6) = 47.76$, $p < 0.05$. The cross tabs are displayed in Tables 4.11, 4.12, and 4.13, respectively.

Table 4.11

Cross Tabs, Question 47 and Total EDE-QS Score

		Question 47		
Total Score		No Diet	Diet	Total
0	Count	28.00	5.00	33
	Expected Count	24.10	8.90	33
	Adjusted Residual	1.70	-1.70	
1-5	Count	91.00	22.00	113
	Expected Count	82.40	30.60	113
	Adjusted Residual	**2.50**	**-2.50**	
6-10	Count	34.00	21.00	55
	Expected Count	40.10	14.90	55
	Adjusted Residual	**-2.10**	**2.10**	
11-20	Count	19.00	16.00	35

	Expected Count	25.50	9.50	35
	Adjusted Residual	**-2.70**	**2.70**	
Total	Count	172.00	64.00	236
	Expected Count	172.00	64.00	236

Note. Question 47 reads, "Are you currently on a diet?"

Based on the adjusted residuals, those that were not currently following a diet were more likely to have a total EDE-QS score of 5 or less, which resulted in low disordered eating behavior. Those that were currently following a weight loss diet were more likely to score between 6-10, and 11-20 on the EDE-QS, which demonstrated a higher level of disordered eating behavior.

Table 4.12

Cross Tabs, Question 48 and Total EDE-QS Score

	Question 48			
Total Score		No Diet	Diet	Total
0	Count	29.00	4.00	33
	Expected Count	15.80	17.20	33
	Adjusted Residual	**5.00**	**-5.00**	
1-5	Count	65.00	48.00	113
	Expected Count	54.10	58.90	113
	Adjusted Residual	**2.80**	**-2.80**	
6-10	Count	13.00	42.00	55
	Expected Count	26.30	28.70	55
	Adjusted Residual	**-4.10**	**4.10**	
11-20	Count	6.00	29.00	35
	Expected Count	16.80	18.20	35
	Adjusted Residual	**-3.90**	**3.90**	
Total	Count	113.00	123.00	236
	Expected Count	113.00	123.00	236

Note. Question 48 reads, "Have you ever dieted?"

Based on the adjusted residuals, those that had never followed a diet were more likely to have a total EDE-QS score of 0, or 1-5, which demonstrated low to none

disordered eating behavior. Those that had followed a weight loss diet were more likely to score 6-10, or 11-20, which demonstrated a higher level of disordered eating behavior.

Table 4.13

Cross Tabs, Question 52 and Total EDE-QS Score

		Question 52			
Total Score		No diet	≤ 1 year	> 1 year	Total
0	Count	29.00	1.00	3.00	33
	Expected Count	18.30	8.40	6.30	33
	Adjusted Residual	**4.00**	**-3.20**	-1.60	
1-5	Count	72.00	17.00	24.00	113
	Expected Count	62.70	28.70	21.50	113
	Adjusted Residual	**2.40**	**-3.50**	0.80	
6-10	Count	17.00	24.00	14.00	55
	Expected Count	30.50	14.00	10.50	55
	Adjusted Residual	**-4.20**	**3.50**	1.40	
11-20	Count	13.00	18.00	4.00	35
	Expected Count	19.40	8.90	6.70	35
	Adjusted Residual	**-2.40**	**3.80**	-1.20	
Total	Count	131.00	60.00	45.00	236
	Expected Count	131.00	60.00	45.00	236

Note. Question 52 reads, "How long did you keep the weight off [from dieting]?"

Based on the adjusted residuals, those that did not participate in any dieting behavior are more likely to have a total EDE-QS score of 0 or 1-5, and less likely to demonstrate low disordered eating behavior. Those that kept weight off from a weight-loss diet less than or equal to 1 year were more likely to score 6-10 or 11-20 and demonstrate a higher level of disordered eating behavior. Those who kept weight off greater than 1 year, had no relationship with dieting and disordered eating behavior.

Research Question 3

Research question 3 stated "*What are the effects of BMI, gender, years certified, setting, region, a type of work (sedentary, standing, lifting, and heavy lifting/strenuous) on physical and mental work ability?*" The odds of having a decreased work ability (physical and mental) as a function of BMI were determined through ordinal logistic regression. The initial scale offered for physical and mental work ability included responses of poor, fair, good, very good, and excellent. However, in order to meet assumptions, responses of "poor" and fair" were combined with "good" due to low response rate, and a three-point scale was created with the remaining responses. Therefore, the odds ratio expresses having one-point lower work ability on excellent, very good, and good.

Two analyses were performed in relation to each type of ability: physical work ability, Question 71, and mental work ability, question 72. One model was used for each analysis, which controlled for gender, years certified, setting, region, and type of work. The predictor variables were tested a priori to validate there was no violation of the assumption of multicollinearity, independence, goodness of fit, and test of parallel lines. Chi-square tests and Cramer's V were used to determine data independence and multicollinearity; no correlations were detected. Because the test of parallel lines was violated, modifications were applied. For question 70, "what best describes your physical work demands", the response of "heavy and strenuous" was combined with "lifting tasks involved" , as it contained only 5 responses. For question 71, physical work ability, and 72, mental work ability, any responses of "fair" or "poor" were combined with

"good", as they contained less than 20 responses each. Additionally, the responses of "other" and "prefer not to respond" were removed for gender as they contained less than 5 responses, each. Once this was completed, the test of parallel lines for each analysis was acceptable.

However, For Psuedo R-square, the Nagelkerke value was suspiciously high for both dependent variables at 0.94 for Q71, and 1.00 for Q72. In addition to that poor outcome, when dependent variable levels by observed combinations of predictor variable values, 66.7% of the cells had zero frequencies. In order to rectify this, the same combinations for the independent variables from research question 2 were applied (for region and years certified). Unfortunately, this only brought the zero frequency to 50%. If data was combined or reduced any further, it would have rendered it uninterpretable. Because of this violation of assumption of frequencies, research question 3 is not viable for discussion. A discussion of the results will conclude in chapter V.

CHAPTER V

DISCUSSION AND CONCLUSION

Though the goal of most healthcare professionals is to improve quality of life in their patients, this may include diet and exercise however, it is clear that these same behaviors are not practiced in the provider's own life. This lack of healthy role-modeling in healthcare professions can weaken patient adherence and cooperation (Oberg and Frank, 2009). Though health role-modeling has not been significantly studied in athletic trainers, the first step to better understand patient adherence is to understand the health behaviors of athletic trainers. The results of this research suggest athletic trainers do not demonstrate the greatest role modeling when it comes to health behaviors, especially diet.

Demographic Data

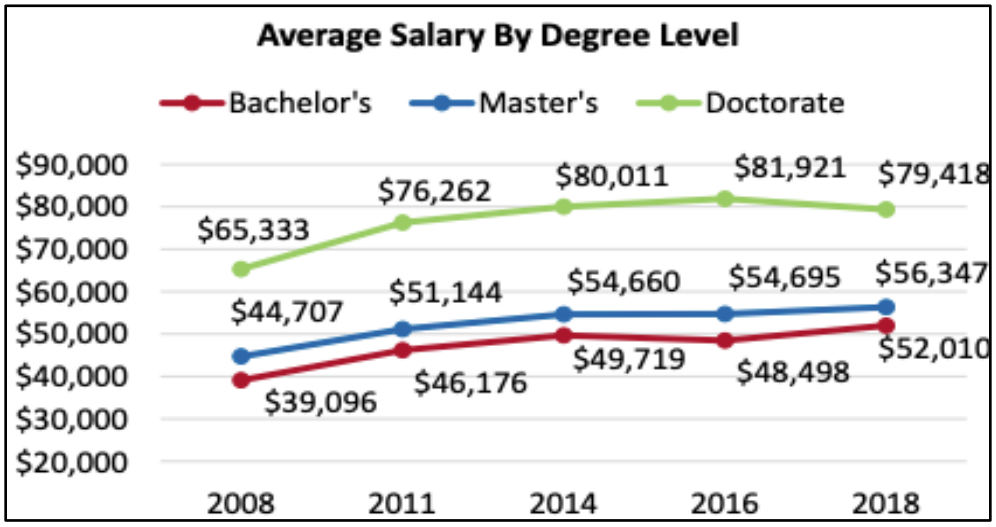
This research sought to look at the specific variables of body measurement index (BMI), eating patterns, physical activity (PA), and work ability in athletic trainers. It compared these variables against gender, age, years since certified, occupational setting, region of residence, average amount of hours spent working per week, and average annual salary. When discussing descriptive statistics, more cisgender females (N=165) responded than cisgender males (N=96), with 4 responding as "other" or "prefer not to respond." The average

age was 34.61, SD = 9.95. Average BMI was 27.13, SD =5.70, which is considered "overweight." The majority of participants fell in the ranges of years certified of 1-5 and 6-10. The average hours worked per week is 44.80, SD = 12.81, and most participants annual income was ranged between 40k and 50k.

Though most of the demographics are similar to the NATA's annual surveys, it is important to comment on annual income as it does play a role in access to food variety, physical activity (PA), and healthcare. For example, the 2018 NATA salary survey executive summary places the average income for athletic trainers at $57,203 (NATA, 2018). However, this may have been inflated by the salaries of those with doctorates as depicted in figure 5.1 (NATA, 2018).

Figure 5.1

2018 NATA Average Salary by Degree level (NATA, 2018)



Furthermore, although these numbers have increased over the past decade, the salary survey reports that ATs still make less than other healthcare practitioners and technical occupations (at a median of $64,770) (NATA, 2018). Additionally, average hours worked per week was similar with the NATA salary survey indicating an average of 50. Though

there are two years difference with these demographics, it is important to consider the role of COVID-19 and how it affected labor (pay-cuts, furloughs, layoffs, hour-cuts, redistribution of work, and general lack of normalcy) (Winkelmann and Games, 2020). Based on personal anecdotal evidence and Winkelmann's et al. (2020) empirical evidence, the results of the present research are different than what would have occurred sans pandemic. As a result of labor statistics during COVID-19, similar speculations may be assumed for health behaviors.

Although salary and average hours from the present study are somewhat similar to the NATA's 2018 data, new data on AT BMI and PA also demonstrate similarities with previous research. Torres-McGehee et al. (2020) research on AT energy balance and pathogenic behaviors demonstrates similar results of more ATs having an "overweight" BMI (44.4% n= 20 out of N= 46). Though the statistics from the present study and Torres-McGehee et al. (2020) align, the surprising piece is the average BMI is considered "overweight" in athletic trainers. This statistic is closely aligning itself to the alarming obesity epidemic that affects over 30% of the US population (Nuttal, 2015; Kyle, et al., 2017). As stated in chapter 1, although ATs may be expected to have a greater picture of health due to working in a physically active environment, it is clear from the present study that no person is immune to becoming overweight or obese.

In the present study, although the average BMI of athletic trainers is categorized as "overweight," the most frequent level of PA is "highly active," where one surpasses the recommended activity level of 150-300 minutes of moderate intensity PA or 75-150 minutes of vigorous PA per week (USDHHS, 2018). Independent of gender, career

setting, or number of hours worked per week, over 77% of ATs met the ACSM's minimum guidelines for PA. Table 5.1 displays the frequency of PA levels.

Table 5.1

Frequency of PA levels

PA Level	Frequency	Percent
Inactive	19	7.17
Insufficiently Active	41	15.47
Active	59	22.26
Highly Active	146	55.09
Total	265	100.00

Similar data is reported by Torres-McGehee et al (2020), stating that approximately 60% of ATs in their population met the ACSM's minimum PA recommendations. However, in the present study, when unhealthy eating is comparted to healthy, unhealthy eating has a greater average score, M=36.96, SD = 6.93 as compared to healthy eating, M=33.54, SD=5.62. When the impact of BMI, PA level, and diet through descriptive statistics is analyzed, it can be speculated that AT's are trying to "outrun" a poor diet and failing. With this, future research in understanding psychosocial idiosyncrasies related to eating and exercises is important. Consequently, although this data is useful in drawing attention to discrepancies, it does not complete our investigation. A discussion of the three research questions will follow to support this hypothesis.

Research Question One

The first research question asked if there are differences in BMI, PA, and nutrition by gender, work setting, years certified or by region. Although many variables were present, the analyses yielded only two significant results. The first significant result was gender and BMI and the second was setting and light physical activity.

Gender and BMI

Gender was significant when compared to BMI, which demonstrated cisgender males (referred to as "males") have a greater likelihood than cisgender females (referred to as "females) to have a higher BMI score. These results agree with most general gender and BMI research (Sharma, Mudgal, Thakur, Gaur, and Aggarwal, 2020; Zhang et al., 2019; Torres-McGeHee 2020). It is hypothesized that females, in general, would have a greater BMI than males due to excess fat deposits from reproductive anatomy, which allows the body to store more fat to bear offspring (O'Sullivan, 2009). However, although females may have a greater body fat percentage than males, their reported BMI is lower, in most research. A study completed on nursing and medical students indicated that males had an increased BMI in comparison to other genders (Sharma et al., 2020). Furthermore, research completed on Chinese residents indicates that males had a significantly greater BMI than females (Zhang et al., 2019). The following chart (Figure 5.2) from the Center for Disease Control (2014), demonstrates the spread of obesity levels, with males having a greater prevalence of overweight and obesity in the United States, then females.

Figure 5.2

Estimated (Age-Adjusted) Percentage of US Adults with Overweight and Obesity by Sex, 2013–2014, NHANES Data (Fryar, Carroll, Ogden, 2014)

	All (Men and Women)	Men	Women
Overweight or Obesity	70.2	73.7	66.9
Overweight	32.5	38.7	26.5
Obesity (including extreme obesity)	37.7	35	40.4
Extreme obesity	7.7	5.5	9.9

Though previous research supports the present study, the question of why there are differences, remains. We know that innate factors such as genetics, gender, age, and development can all contribute to differences in BMI in general, but when literature is reviewed that relates to gender and BMI, a significant amount of evidence points toward psychosocial inferences.

This statistic, of males having a greater BMI than females and other gender identifiers, may have been influenced by male stereotypes in general populations such as having a well-built and muscular physique (Kuan, Ho, Shuhaili, Siti, Gudum, 2011; Patricia and Arnold, 2002). This male stereotype may be the driving force for the desire to be heavier (Kuan et al., 2011; Patricia and Arnold, 2002). In line with this stereotype, Kuan et al. (2011) discovered that one-third of males prefer to be overweight. Additionally, males have a greater chance of becoming obese if a male friend becomes obese (Christakis and Fowler, 2007). As a result of all of this, it appears males are influenced more by peers, rather than society.

Although the male BMI research is clear and strong, most general gender research suggests that psychosocial reasoning for greater BMI in males is they lack the negative views that females have toward obesity (Manios, Panagiotakos, Pitsavos, Polychronopoulos, and Stefanadis, 2005). Negative views can include body dissatisfaction, preoccupation with weight, and negative affect from failed weight loss attempts (Manios et al., 2005). Due to the negative view females have, they will spend more time, effort, and money on the becoming or staying thin (Manios et al., 2005). Additionally, females prefer their ideal figure to be underweight, (Kuan et al., 2011). These ideals are related to the industrialization of Western Society and increase in media

and popular culture, which inflates beauty culture and the need to be thin (Keel and Forney, 2013). This provocation from the media of "thin is in" puts intense pressure on females and creates a greater risk for developing an eating disorder (Keel and Forney, 2013). Furthermore, Uccula and Nuvoli (2017) demonstrate that females, more so than males, are more likely to overestimate their weight and therefore eat less. Though this research is beneficial in identifying contributing factors, it does not look at niche populations, such as ATs. Future research should identify factors that contribute to greater BMI in ATs.

The Interaction Between Diet and Gender.

Though the results of AT BMI and gender agree with previous gender research, it is surprising that similar results were not observed in healthy and unhealthy eating patterns by gender (Tores-McGeHee et al., 2020). According to previous general research, females have a greater affinity for healthy eating in order to retain a thin physique, while males would more likely gravitate toward the unhealthy eating due to their preferences in meat and alcohol (Arganini, Turrini, Saba, Virgili, and Comitato, 2012; Kanter and Caballero, 2012; Keel and Forney, 2013). In the present study, when comparing the eating indexes (healthy and unhealthy), excluding gender, the healthy index (N = 33.54) demonstrated a low intensity (< 34), while the unhealthy index (M=36.96) demonstrated a medium intensity (34-66). Intensity is what the instrument authors demonstrate as score or affinity. A low intensity demonstrates a low affinity for the specific eating index. The greater the number, the greater the affinity, or intensity, for that style of eating. Additionally, when asked how one would describe their eating pattern, most respondents selected "needs work" (N=144). Because of this, it appears that

ATs are aware of their unhealthy patterns. When observing types of food consumed “a few times a week” or greater, the data is mixed (observed in Table 5.2).

Table 5.2

Percentage Observed in Food Varieties, A Few Times A Week Or Greater

Food	Percentage
White Bread	38.90
Whole Wheat Bread	49.10
White Rice/Pasta	40.80
Whole Grain Rice/Pasta	41.90
Fast Food	17.70
Deep-Fried	7.20
Fats	36.60
Mayo-Based Products	24.20
Low- or Non-Fat Dairy	37.40
High Fat Dairy	25.70
Healthy Fat	58.50
Processed Meat	22.60
Red Meat	40.80
White Meat	85.30
Seafood	14.30
Eggs	47.20
Plant-Based Protein	36.20
Starchy Vegetables	36.20
Fruit	77.40
Non-Starchy Vegetables	88.30
Sweets	57.40
Pre-Packed/Processed Foods	22.30
100% Fruit Juice	13.60
100% Vegetable Juice	1.90
Sweetened Hot Beverages	32.50
Unsweetened Hot Beverages	45.30
Sweetened Carbonated Beverages	22.60
Energy Drinks	4.90
Water	98.10
Alcohol	38.50

It is important to note that although the amount of times these foods are eaten are displayed, it does not include the amount per serving. Though some numbers do look

appealing, such as non-starchy vegetables, others are concerning such as alcohol consumption and fast food are not.

As stated in chapter 2, the USDHHS (2018) indicates the importance of keeping half your grains whole, varying protein and vegetables, focusing on whole fruits, and moving to low-fat or fat-free dairy milk or yogurt. Following these simple guidelines can assist one in developing a healthier eating pattern to become adequately nourished with a "normal" BMI score (USDHHS, 2015). The USDHHS (2015) has established that moving to a healthier eating pattern can lower risk for diseases such as type 2 diabetes, certain cancer, and cardiovascular disease, which can all occur with obesity. When dietary habits from the present study are observed, the results are mixed. The following tables display percentages of consumption/preparation for dairy (Table 5.3), meat (Table 5.4), bread spreads (Table 5.5), and cooking fats (Table 5.6). Participants could select more than one answer for each of these.

Table 5.3

Dairy Consumption

Dairy	Frequency	Percentage
Full Fat	38	14.30
Low Fat	116	43.80
No Fat	36	13.60
Does Not Consume	91	34.30

Table 5.4

Meat Preparation

Meat	Frequency	Percentage
Boiled	19	7.20
Stewed	37	14.00
Grilled	233	87.90
Roasted	158	59.60
Fried	60	22.60
Does Not Consume	11	4.20

Table 5.5

Bread Spreads

Bread Spread	Frequency	Percentage
Does Not Consume	22	8.30
Mayo	102	38.50
Margarine	19	7.20
Butter	109	41.10
Spreadable Butter	41	15.50
Lard	0	0.00
Jam	102	38.50
Nut Butter	169	63.80
Fluff	3	1.10

Table 5.6

Cooking Fats

Cooking Fats	Frequency	Percentage
Does Not Consume	11	4.20
Room Temp Oil	229	86.40
Coconut Oil	44	16.60
Margarine	8	3.00
Butter	89	33.60
Lard	2	0.80
Other	10	3.80

From the USDHHS (2015), we know that it is ideal to consume low- or non-fat dairy, limit discretionary calories, especially those found in fats and reducing saturated fats found in butter, margarine, and coconut oil, and limiting added sugar contained in items including jam, nut butters, and pre-packaged items (Drewnowski et al., 2019). When observing at the dispersion, it appears that ATs made healthier choices with meat cooking methods (grilling and roasting compared to frying) and consumed low- to non-fat dairy. However, the distribution of bread spreads and cooking fats is questionable, at best. Future research should investigate portion sizes and daily consumption.

Additionally, limiting sodium intake in foods should be considered as well (USDHHS, 2015). The present study indicates that ATs demonstrates most ATs will salt their food, even if only "sometimes." Table 5.7 displays salting preferences.

Table 5.7

Salting Preferences

Response	Frequency	Percent
No	71	26.80
Sometimes	145	54.70
Yes	49	18.50

Though the eating patterns were not significant, it was important to indicate the descriptive information observed from the dietary habit and food frequency items in the survey. The information gave valuable insight into the eating habits in ATs and potential starting points of where mitigation can occur for a healthier lifestyle. As a result of the significant BMI differences in gender and descriptive information for diet, future research should investigate specific variables that relate to BMI, such as nutrition and psychosocial issues. The second significant outcome of research question 1, setting and light PA, will be discussed next.

Setting and Light Physical Activity

In addition to gender and BMI, career setting demonstrated statistical differences with light PA. Post hoc results did not demonstrate a discrete difference between any of the settings most likely due to lack of power, uneven sample sizes, and a large number of settings. Before the results are discussed, it is important to understand the nuances that each work setting demonstrates in athletic training.

Athletic Training Settings.

Athletic trainers have the opportunity to work in varying settings from traditional such as university, secondary school, and professional, to less traditional such hospitals/clinics and emerging settings (performing arts, public safety, military, or occupational health). The responsibilities, amount of physical and mental work, and time commitment vary by setting. In traditional settings, one may have considerable time commitments such as travel and 50+ hour work weeks (Mazerolle, Bruening, and Casa, 2008). Additionally, staffing, irregular scheduling and last-minute changes may contribute to differences observed in traditional versus nontraditional settings. The greater the level of competition, such as large Division I or professional, the greater the professional commitment needed (Mazerolle and Hunter, 2018). For example, personal anecdotal evidence and empirical evidence indicates that although ATs may receive benefits from their work such as paid-time-off, or vacation, they are rarely used to due to staffing difficulties and negative views from supervisors and/or coworkers (Mazerolle and Eason, 2018). Other traditional settings, such as secondary schools, offer less pressure and professional commitment than higher levels of competition. Most ATs that work in high school settings do so due to their love of sport and children, but the

secondary school often require less travel than other settings, such as professional (Gardiner-Shires and Mensch, 2009). However, despite this lack of travel, secondary school ATs are still subject to non-traditional hours such as nights, weekends and holidays (Gardiner-Shires and Mensch, 2009). The present study indicates the average amount of hours worked per week is 44.79. While more college/university ATs responded to this research study, these variables have not been assessed for relationships.

In comparison to traditional athletic training, settings such as hospital clinics, military, and occupation have a different type of professional commitment. However, some of these emerging settings have similar responsibilities observed in traditional settings. For example, those who have worked with the Cirque du Soleil tour are essentially "on-call" or available 24/7 (NATA, 2013). In contrast, military settings and occupational settings have more stable and regimented scheduling and potentially more personal freedom due to the lack of being "on-call" (Vera Cruz, 2013; Welever, 2014). Welever (2014) commented that work in the occupation setting for Boeing allowed him to spend more time with family [than other AT settings]. This is often what draws attraction to these non-traditional athletic training settings, the ability to have a greater work-life balance (Schilling, Pitney, and Mazerolle, 2014). ATs that work in emerging settings often have a greater ability to use paid-time-off or vacation without the repercussions dealt with in traditional settings (Mazerolle and Eason, 2018). With this better quality of life, the amount of jobs in emerging settings has grown approximately 150%, due to consistent work and higher salaries (Schilling et al. 2014). Research has indicated the greater work-life balance can lead to better overall health, wellbeing, and work performance (Greenhaus and Powell, 2006). Thus, employers are beginning to

recognize the importance that work-life-balance can bring to their employees and company. The results of physical activity will be discussed next.

Physical Activity.

Although some ATs may have greater professional commitments than others, 77% of ATs still met the ACSM's recommended guidelines for PA in the present study. This number has increased significantly in the last 10 years, when Groth et al. (2008) and Budruk et al. (2010) reported that only 41% of the ATs in their study met the ACSM guidelines for PA. One would expect PA findings to be lower, especially due to ATs time commitments, but current research indicates that working long hours does not affect physical activity (Angrave, Charlwood, and Wooden, 2015).

As indicated by the ACSM, moderate and vigorous activity deliver the most beneficial effects to health (USDHHS, 2018). Light PA can potentially lengthen the lifespan and is preferred to remaining sedentary and sitting (Rees-Punia et al., 2019). However, there is not strong evidence to support many other benefits (USDHHS, 2018; Rees-Punia et al., 2019). Most research has investigated moderate to vigorous levels of PA and its effects on health. However, one study indicated that lower-income [general] populations are more likely to participate in light activity due to occupational and travel requirements potentially due to walking and use of public transportation (Murakami and Young, 1997). Though no distinction to type of PA intensity was noted, another study indicated that in general populations, those with full-time employment, with active jobs, demonstrated greater PA during the week than those with sedentary jobs. (Van Domelen et al., 2011). Thus, Van Domelen et al. (2011) highlighted the importance of special programs to raise activity levels in the workplace. Groth et al. (2008) also indicated that

professional responsibilities in athletic training such as travel, and time commitment can lead to difficulty balancing professional and personal time. This may result in decreased PA levels. Furthermore, this encroachment on personal time can lead to stress (Groth et al., 2008). Groth et al. (2008) found that even when presented with identical stressful situations, male and female ATs will approach it differently, where females may use PA as a stress reliever and males will find other non-specified ways. In comparison, despite the level of professional commitment that varies among settings, most of the literature stated that athletic trainers are internally motivated, love the profession and role as AT, commitment to learning, and demonstration of care and responsibility for their patients thus, AT research often demonstrates an affinity for the needs of others, such as their patients, rather than themselves (Mazerolle, Myers, Walker, and Kirby, 2018; Mazerolle and Eason, 2018). This commitment to care, though professional, may be a reason for the lack of significant responses with physical activity (Groth et al., 2008). Though previous research is insightful, it is weak when relating setting and light PA. Thus, making conclusions a reach. However, based on the little evidence there is, ATs in more sedentary, low-income settings may be more likely to participate in light PA. Although most ATs report their type of work is standing or sitting, no relation between leisure-time physical activity level and working activity level has been previously explored. This is important as it may assist in establishing in a greater understanding of job duties and professional responsibility by setting, and therefore give greater insight into health behaviors. This is noteworthy and should be investigated in future research.

Conclusions, Research Question One

The results of this study were similar to those observed in previous research, however, they open up larger areas of inquiry to follow up in future studies. With gender and BMI, it was discovered that males are more likely to have a greater BMI. Previous research points to psychosocial issues in the general population, but will these variables be similar in ATs? Additionally, setting and light-intensity PA proved to significant, but little research has been conducted relating light-intensity PA and occupation in general, let alone with ATs. Future research can highlight the impact that occupation, setting, and working activity level has on PA level. Moreover, there is little research regarding light-intensity PA in general. This is noteworthy for an in-depth exploration in areas such as endocrinology, cardiology, and exercise physiology with use of biomarkers and vital signs. Finally, the eating indexes did not report significant results with any variable, but it was important to investigate the impact of healthy versus on healthy eating on AT health. Though diet did not produce significant results, research question 2 will discuss some of the ramifications other eating patterns have on different demographics.

Research Question Two

The second research question (RQ2) focused on weight-loss dieting and disordered eating and was composed of two sub-questions. Dieting behavior is identified through questions 47, 48, 50-52. Question 49 asks about specific popular diets and was used for descriptive statistics rather than further statistical analysis. Additionally, for all intents and purposes, any time “diet” or “dieting” is mentioned in this section, it is referring to a weight-loss diet rather than pattern of eating. The first part of RQ2 sought to identify any differences in dieting behavior between gender, years certified, setting,

and region. Chi square tests were used to determine differences, with two statistically significant. Gender and Question 48, “Have you ever followed a diet?” was statistically significant. Years certified and Question 52, “How long were you able to keep the weight off [from dieting]?” also demonstrated statistical significance. The second part of RQ2 asked if disordered eating patterns relate to the dieting behavior. Disordered eating is determined by the EDE-QS total score, then separated into 4 categories (0, 1-5, 6-10, 11-20). Chi square tests were used to determine differences and three were found to be significant. Question 47 “are you currently following a diet?” and total score, Question 48 “Have you ever followed a diet?” and total score, and Question 52 “How long were you able to keep the weight off” and total score all demonstrated statistical significance.

Out of the 265 total participants in the present study, there were 123 that had not participated in a weight loss diet while 142 had for either personal or medical reasoning. Of those that participated in a diet, 1-3 months was the most common length to participate (48% out of those who dieted). The majority lost weight (90%), but results were mixed with weight loss sustainability, demonstrated in Table 5.8. The frequency of specific type of weight-loss diets are displayed in Table 5.9.

Table 5.8

Amount of Time Weight was Maintained from Dieting

Time	Frequency	Percent
Did Not Diet	142	53.60
1-3 months	24	9.10
4-6 months	25	9.40
7-9 months	12	4.50
9-12 months	11	4.20
1-1.5 years	6	2.30
1.5-3 years	20	7.50
> 3 years	25	9.40
Total	265	100.00

Table 5.9

Frequency of Weight-Loss Diets

Diet	Frequency	Percent
Low cal	45	17.00
Low carb	39	14.70
Intermittent Fast	38	14.30
Keto	28	10.60
Other	27	10.20
Elimination	15	5.70
Whole 30	13	4.90
Vegetarian	12	4.50
WW	12	4.50
Fast	11	4.20
Noom	11	4.20
Paleo	11	4.20
Juice Cleanse	6	2.30
Atkins	5	1.90
Vegan	3	1.10
Blood Type	2	0.80
Mediterranean	2	0.80
Zone	2	0.80
DASH	1	0.40
Grapefruit	1	0.40

Nutrisystem	1	0.40
South Beach	1	0.40
Blueprint	0	00
Cabbage	0	00
Jenny Craig	0	00
Mind	0	00
Raw food	0	00
TLC	0	00
Volumetrics	0	00

Based on the factor analysis, it appeared that "User-created" diets (low-cal and low-carb) detail the largest percentage. This is closely followed by "Elimination" based diets, where the dieter removes a whole category or more of food from their diet. Although many of these diets could fit into many other categories, most of them are commercialized and heavily marketed through media. More on media's influence will follow in the "eating disorder and dieting" section, but first a discussion of each part of RQ2 will commence.

Gender and Dieting

The results of RQ2 demonstrate that females are more likely to participate in a diet than males, which aligns with this previous [general] gender and diet research (Uccula and Nuvoli, 2014; Manios et al., 2005). We learned from RQ1 that in general females are more likely to have negative views of obesity and try to maintain a slim physique, in comparison to males who lack these views (Manios et al., 2005). One way females can accomplish this is through undereating, by creating a caloric deficit, which could be considered "dieting" (Uccula and Nuvoli, 2017). These negative views and diet idea are internalized from societal pressure, which can result in body shaming and negative feelings (Boie, Lopez, and Sass, 2012). Additionally, it will cause females to continually monitor their physique (Boie, Lopez, and Sass, 2012). This social judgement

and unrealistic goals that females set for themselves regarding weight have been fostered in a dieting culture (Conley and Boardman, 2007). The ideation of feminine beauty has become fixated on being thin in recent decades, where models, actresses, and other socialites perpetuate these ideals by showing off their thin figures which creates unrealistic goals for the lay audience (Ferreira et al.e, 2011). In additional to societal pressure, females are more likely to experience family criticism regarding weight, shape, and eating behavior than males, often starting in childhood (Micali, et al., 2015; Liechty and Lee, 2013). These dangerous pressures can severely elevate the risk for eating disorders in adolescence and young adulthood (Cena et al., 2017). This realm of inquiry has not been studied in ATs before and is foundational for future research. Prior to an in-depth discussion of dieting and eating disorders, age as it relates to year certified and retained weight loss will be discussed.

Years Certified and Maintained Weight Loss

A Chi-Square test revealed that those that have been certified for 6-10 years are less likely to sustain weight loss [from dieting] for greater than 1 year, while those certified for greater than 20 years are more likely to sustain weight loss for greater than 1 year. Though we did not test correlation of age and years certified, it can be assumed that those in the profession for greater than 20 years are greater in age than those in the profession for 6-10 years. Previous research on general populations indicates that although many can achieve clinically significant weight loss through diet and PA, more than half the individuals that start a weight-loss program will return to baseline weight within 3-5 years (Voils et al., 2016). The short answer is that fad diets do not work when

trying to achieve a long-term solution (Khwandanah and Tewfik, 2016). But why do older generations trend with greater weight-loss sustainability than younger generations?

We know from Chapter 2, that most diets do not result in long-term weight loss and lack long-term sustainability (Khawandanah and Tewfik, 2016). There is no research relating athletic trainers' experience and weight loss. However, research involving the general public's age and retained weight loss indicate that young adults (YAs) (aged 18 ~ 35) are less likely to initiate a weight loss program, more likely to drop out of lifestyle trials, and negative self-care will increase due to more responsibilities (Voils, et al., 2016). Although appearance is a strong motivator for YAs, the effects of obesity in the long-term are less salient for this population (Voils et al., 2016). Additionally, a lack of social support with dieting can sabotage dietary change (Voils et al., 2016). These factors may be a result of the transition from adolescence to adulthood, which is an impressionable life stage, leaving YAs vulnerable (Wood et al., 2018). Social media may also exploit this YA vulnerability with descriptive marketing and endorsements designed to show the illusion of happiness and success, enticing the consumer to purchase (Freeman, Kelly, and Vandevijvere, 2015). It appears that interventions that involved healthy choices during this life stage are important, as poor behavior can carry out into long-term health implications such as diabetes and cardiovascular disease (Gakidou et al., 2017). It appears that this "superman syndrome" of "nothing can happen to me", along with vulnerability is what affects YAs and potentially those certified 6-10 years and why they cannot retain weight loss.

In comparison to YAs, the opposite of the "superman syndrome" occurs with adults (35-50) and elders (>50), in where they become aware of their mortality (Voils et

al., 2016). Obesity has more impact in this demographic as it can significantly decrease the quality of life with factors such as cataracts, urinary incontinence, and frailty (Villareal, Apovian, Kushner, and Klein, 2005). When combined with PA, the effects of dieting may decrease disease and disability (Gill, Vartels, and Batsis, 2017). Additionally, as eluded to above, adults [in general populations] are more likely to have a medical trigger to lose weight than YA (LaRose, Leahey, Hill, and Wing, 2013). With this, those who need to lose weight due to a medical trigger are more likely to sustain the weight loss, as compared to other triggers (Gorin, Phelan, Hill, and Wing, 2005). Consequently, although this previous research looks at general populations, this could explain why those certified for greater than 20 years are more likely to maintain their weight loss for greater than a year when compared to those certified 6-10 years. Although this maintenance may be beneficial for adults, the lack of maintenance and "yo-yo" dieting can wreak havoc on YAs physically and psychologically. A full discussion on dieting and how it leads to disordered eating is discussed in the next section.

Disordered Eating and Dieting

We know that the EDE-QS measures disordered eating or the risk of developing an eating disorder on a continuous scale that can be summed into categories. Total scores can range from 0 to 36, with 0 being no risk, and 36 being highest risk for an eating disorder. In the currently population, only 12.8% of participants scored "zero." An inverse relationship is observed with the remaining scores, the higher the score, the lower amount of people scoring that high, observed in Table 5.10.

Table 5.10

EDE-QS Total Score Frequencies

Score	Frequency	Percent
0	34	12.80
1	24	9.10
2	22	8.30
3	24	9.10
4	24	9.10
5	23	8.70
6	16	60
7	14	5.30
8	11	4.20
9	9	3.40
10	9	3.40
11	8	30
12	9	3.40
13	6	2.30
14	3	1.10
15	6	2.30
16	6	2.30
17	6	2.30
18	3	1.10
19	2	0.80
20	2	0.80
24	2	0.80
27	1	0.40
36	1	0.40
Total	265	100.00

Despite the low number of participants with higher scores, the present study revealed significant outcomes with dieting in relation to disordered eating. For question 47, “are you currently dieting?” demonstrated a defined relationship between those who were not dieting, and those who were. Those who were not dieting were more likely to score between 1 and 5 and less likely to score greater than 5. The inverse is observed for those who were currently dieting. The same pattern was observed for question 48 “have you

ever dieted," but with even stronger adjusted residuals. The same pattern was observed for question 52 "how long did you keep the weight off?" Based on this data, dieting and disordered eating do have a relationship in ATs. We know that ATs have a duty to optimize health and wellness, however, based on this data, it appears they are demonstrating poor management of it. Torres-McGeHee et al. (2020) demonstrated similar results of disordered eating behaviors in ATs by looking at probable causes. These disordered eating behaviors can include a sense of interpersonal insecurity and alienation, emotional dysregulation, perfectionism, and maturity fear (Torres-McGehee et al., 2020). These behaviors may also be related to lack team cohesion, difficulty with rapport and trust from patients and peers, and the burden of constantly educating others on the role of ATs (Torres-McGehee et al. 2020). There is minimal information relating ATs and eating disorders, which makes the results of this study novel. Future research should look at environmental factors such as average hours worked per week and income as risk factors for disordered eating behavior. But first, we will investigate known risk factors that relate dieting and eating disorders.

Age as a Risk Factor.

Though the present study did not look at age, specifically, it did investigate "years certified" and found that those that are certified from 6-10 years (essentially, young adulthood) struggle with maintaining weight loss as compared to those who are certified greater than 20 years (middle age to elders). In order to explore this further, we need to first understand the foundation of why this may be occurring. As eluded to in the first part of RQ2, one of the largest risks for developing an eating disorder (ED), in general, as a result of dieting that can start as early as childhood and/or adolescence (Cena et al.,

2017; Spear, 2006; Micali et al., 2015). This relationship has a stronger chance of development if there is a positive history of childhood obesity (Cena et al., 2017). Healthcare providers and parents/guardians recognize the impact that childhood obesity can have later in life as it is a strong predictor of chronic disease such as type 2 diabetes, hypertension, and cardiovascular disease (Cena et al. 2017). This renders childhood obesity as unfavorable and unattractable (Cena et al., 2017). Though the long-term effects may be the driving force behind weight-loss in childhood, the "unspoken" factors are also present. These are most likely related to psychological impact of thinking that being slim is necessary for value and success, which often results in bullying from peers and family (Cena et al., 2017). In addition to childhood obesity, the psychological impacts that adults face, especially females, such as pressure to be thin, dietary restrain, weight stigma, body dissatisfaction, and negative affect from these pressures, may effect children as well (Stice, NG, and Shaw, 2010; O'Hara, Tahboub-Schulte, and Thomas, 2016). Often, this adult fear is a result of childhood weight stigma.

Further evidence of why disordered eating and EDs develop in childhood may be due to the shift that occurs with dieting where reliance is on physiological needs such as hunger and fullness to a psychological control (Spear, 2006). This psychological impact can decrease self-efficacy, create negative affect, and body dissatisfaction at the current stage and later in life (Cena et al., 2017). Cena et al. (2017) demonstrates that 84% of the participants in their study who had obesity in childhood had dieted. This dieting in childhood will increase the risk of EDs during adolescence and continue through adulthood (Neumark-Sztainer, Wall, Larson, Eisenberg and Loth, 2011). Furthermore, EDs are more prevalent in childhood than type 2 diabetes, but are often underdiagnosed

(Campbell and Peebles, 2014). Other risk factors such as dietary restrain and weight stigma are often early indicators of development of EDs (Campbell and Peebles, 2014).

After the trauma that obesity can exhibit in childhood, comes the trauma that one can experience in regard to weight concern in adolescence. Adolescents are the most vulnerable and ill-equip in dealing with psychological change and growth than any other stage of life (Mabe, Forney, and Keel, 2014). They often easily influenced by the world around them, engaging in riskier and/or unhealthy behaviors due to few consequences and/or care (Voils et al., 2016). This can include attempts to lose-weight via diet and/or PA, which can result increased risk for pathologies in eating (Mabe et al., 2014).

In addition to adolescence, disordered eating in childhood can span into young adulthood as well, if left unchecked (Mabe et al., 2014). Though adolescence is a pivotal time in life, ridden with the effects of puberty, leaving one vulnerable and ill-equipped in dealing with life change, similar symptoms are observed in young adulthood. Unlike adolescence, young adults are set free into the professional world, feel similar vulnerability, but without the protection and guidance that is present in adolescence (CIHSWBYA, 2015). Young adults have greater awareness of consequences and impulse control, but can still display some of the vulnerable characteristics of adolescence (CIHSWBYA, 2015). This can include behaviors such as poor eating habits, experimenting sexually, and with substances such as alcohol, tobacco, and illegal drugs (CIHSWBYA, 2015). We know that in terms of "years certified" and the dieting behavior questions, those that are certified for less amount of time (6-10 years), essentially younger in age, struggle with dieting and weight-loss more than those that have been in the profession for 20 years. If an eating disordered or poor eating patterns and behaviors

are left unchecked during adolescence, the result in young adulthood is poor mental health and lacking the skills to successfully cope (Mabe et al., 2014). Furthermore, CIHSWBYA (2015) states that young adults are less likely to exercise, eat breakfast, get regular health check-ups, and engage in risky behaviors (as mentioned above). We already know that ATs meet their exercise requirements, however, general research on skipping breakfast indicates those that skip breakfast are more likely to get their energy needs from discretionary foods (or easily accessible foods) with added sugars and have a greater risk of cardiovascular disease, weight gain, and potentially obesity (St-Onge, et al., 2017). Though ATs meet their PA requirements, these poor behaviors such as breakfast skipping and health check-ups that have been measured in general populations, are setting young adults up for weight gain, and with the combination or poor mental health, can be a recipe for poor dieting behavior, and ultimately development of an eating disorder. Consequently, Spear (2006) suggests that the best way to combat this poor psychological onset is for dietetic professionals and healthcare providers need to be educated and become aware of these risk factors, so they can best counsel patients to a healthier lifestyle. Ideally, parents that are concerned about a child's weight should consider this in childhood, rather than try to rectify it on their own. When concerned with ATs, it appears that more education is needed in regard to nutrition, obesity, long-term effects of poor eating habits. This is noteworthy for consideration of greater nutritional and obesity education standards efforts through the Commission on Accreditation of Athletic Training Education for AT students, and for Board of Certification continue education units for those that are already certified. Although improving nutritional education is important for patient care, we know that improving nutritional and obesity

knowledge in ATs could potentially improve their own lives, resulting in greater health role-modeling and patient adherence. Starting this with AT students would be even more beneficial, as it sets them up for the rest of their career. More risk factors for dieting and eating disorder development will be discussed in the next section.

The Media as a Risk Factor.

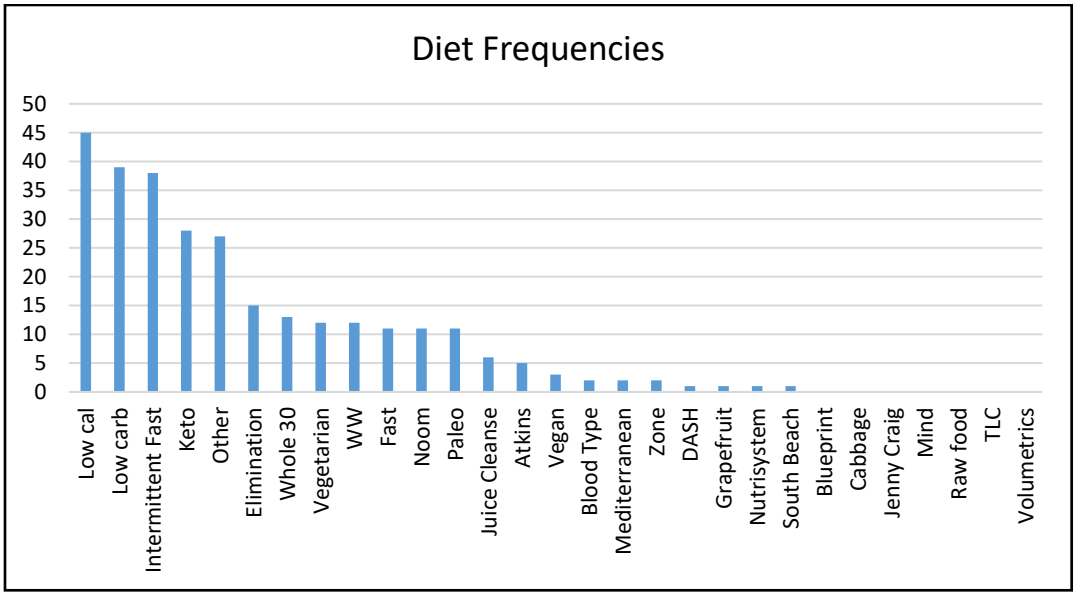
Age plays a role in disordered eating risk, as we have established in the previous section. We know that young adults, or those certified 6-10 years as it is related to the present study, struggle with weight-loss maintenance and are therefore are at a greater risk for eating disorders. In addition to age related influences, another risk factor for dieting and disordered eating, in general, that exists alongside of age is social media influence (Mabe et al., 2014). Social Media has emerged to be a common theme throughout this discussion. We know from the previous section that adolescents and young adults are both vulnerable populations when it comes to any kind of influence. However, even more so than parental or environmental, social media proves to be the strongest influence on adolescents to be thin, especially within females (Tiggemann, Gardiner, and Slater, 2000). Similar evidence is observed in young adults (Liechty and Lee 2013; Cena et al. 2017; Walseth and Tidslevol, 2020). In a study of with 18–30-year-old social media users, results demonstrated that participant exposure to image-related social media content can create greater body dissatisfaction as a result of comparison, and therefore the want to modify appearance through diet (Rounsefell et al., 2019). This could be relational as to why ATs certified from 6-10 years, and especially females, engage in dieting behaviors.

Celebrity influence is one of the largest parts of social media. Aside from just looking the part of thin and portraying the perfect body, celebrities influence this negative weight culture with brand deals which market weight-loss supplements, diets, and products that promote diet culture through social media outlets such as *Instagram* (Walseth and Tidslevold, 2020; Venus Jin and Ryu, 2020). These social media posts create envy, obsessive-compulsive buying tendency, and most importantly, trust which is a large contributor because consumers want to believe their favorite celebrity and feel close to them (Venus Jin and Ryu, 2020). However, these celebrity dieting models often produce a large amount of misinformation and fabrication, such as "I lost 30 pounds in 4 weeks with this product," which, when looking back to chapter 2, can be dangerous and/or misleading (Myrick and Erlichman, 2020). ATs, and specifically those certified for 6-10 years, may be more vulnerable to this influence due to the profession being "time poor" (Fiese 2018). Time poor is when the amount of discretionary time is minimal, resulting in fewer occasions to eat properly (Fiese, 2018). This poorness of time can often limit the amount of nutrient-dense foods one can prepare and/or consume (Fiese, 2018). We know from our discussion that ATs are often investing more of their time into patient care and do so with non-traditional working hours (Mazerolle, Bruening, and Casa, 2008). Therefore, these "miraculous" dieting products marketed through social media that promise little additional time and planning, may be even more attractive to ATs. We will further explore social media's influence on dieting and the effects on ATs in the present study.

We have already established that when observing the types of diets survey respondents participated in, many are either new or old celebrity-endorsed diets. Figure 5.3 demonstrates the most popular diets from the current study.

Figure 5.3

Diet Frequencies



Though the most popular weight-loss diets are "user-created," based on the factor analysis, these user-created diets are often a result of other popularized diets. For example, low-carbohydrate diets had the second greatest frequency. Although it is generic in the present study, low-carbohydrate dieting was made popular by Dr. Robert Atkins and "The Atkins Diet" in the 1990s (Di Pasquale, 2019). Atkins was not the first to develop low-carbohydrate diets, but was one of the first to popularize it using celebrity endorsers such as Sharon Osborn and Rob Lowe (Di Pasquale, 2019). As stated in chapter 2, these fad diets are often unsustainable and result in more weight gain than before they tried dieting, resulting in yo-yo dieting and a cycle of disordered eating (HRF, 2014, Kwandanah and Tewifik, 2016).

Though low-carbohydrate dieting may be "all the rage," stemming from Atkins, the Ketogenic Diet, Zone, or a user-created low-carbohydrate diet, they have paved the way for social media to promote other problematic diets and dieting products. Many celebrities have been criticized because of this misleading information, and the negative image it portrays, especially to vulnerable younger audiences. For example, Kim Kardashian West, one of the most well-known celebrities in the world, was criticized for marketing an appetite suppressant lollipop on *Instagram.* Many condemned that it contributed to eating disorder culture, with remarks such as "eating isn't shameful, our bodies aren't shameful. We deserve better" (Oppenheim, 2018). This is only one example of the many other celebrity endorsed diet products that contribute to eating disorders that exist. Though many of these endorsements are called out on their negative depictions, social media continues to barrel through backlash and can be observed within the current data through the amount of dieting and types of diets. However, as a result of social media fostering negative body image and weight management views, there is a push toward body positivity in social media (Cohen, Newton-John, and Slater, 2020). Although it is great in theory, it is relatively new (~2012), and will take time to break down the barriers associated with being thin. The final part of eating disorders in relation to dieting is discussed in the next section.

Psychological Impacts of Dieting and Eating Disorders.

The results of this study indicate that those who participate in diets are more likely to have a level of disordered eating. We discussed predisposing factors and now the effects of the disordered eating on the psyche will be discussed in order to have a full picture of what ATs with disordered eating behaviors may be facing. We know from

chapter 2 the characteristics of the three most common eating disorders, anorexia nervosa, bulimia nervosa, and binge eating disorder. They require specific criteria to diagnose, but when not all criteria is met, they fall into the "avoid/restrict food intake disorder" category (APA, 2013). This is all important to understand, but only a physiological discussion was included. We will now explore more of the psychological side of eating disorders and what it means for ATs that demonstrated higher scores in the EDE-QS.

Eating disorders, specifically anorexia nervosa, have the highest mortality rate among all mental disorders due to the physical manifestation that coincides with the psychological impact, as well as common co-morbidity of depression leading to increased attempted and completed suicide (APA, 2013; Herzog, Keller, Sacks, Yeh, and Lvori, 1992). Though we did not distinguish between specific EDs and symptoms, it is important to consider as this discussion can play an important role in AT health and how to better understand certain behaviors. Depression, a common mental disorder characterized by negative affect and loss of interest in activities of daily living can occur either before or after the onset of EDs (Bulik, 2002; Herzog et al., 1992). Family history of depression and EDs is one of the major influencing factors (Bulik, 2002). An ED and depression comorbidity can manifest in multiple forms such as: social withdrawal, insomnia, irritability, confusion, negative self-appraisal and body image, neuroticism, impulsivity, and general psychological distress (Saleem, Sattar, Zafar, and Bin Ismail, 2014).

A common comorbidly of depression and eating disorders is anxiety, which is characterized by excessive worry, fear, and apprehension (Bulik, 2002). Like depression,

anxiety can occur before or after the onset of an ED (Bulik, 2002). Anxiety manifests in many forms in eating disorders, particularly obsessive-compulsive tendencies, fear of weight gain, weight and food preoccupation, and perfectionism (Bulik, 2002; Keel and Forney, 2013). Perfectionism is a form of anxiety in which one fears mistakes and that being the best is the only way to achieve social acceptance (Keel and Forney, 2013). This inevitably leads to failure and negative self-worth, which contribute to depression (Keel and Forney, 2013). Those that present with this comorbidity often have greater rates of attempted suicide and mortality (Franko et al., 2004; Crow et al., 2009). Perfectionism has been observed in ATs, reflecting the high demand placed upon them in career as well as historical socialization within teams cultivating a drive to always be better (Torres-McGeHee et al., 2020). Since perfectionism has been documented in AT literature before, it is important for healthcare providers to recognize the impact it can have on the AT, especially if there is disordered eating behavior. In comparison to physical disorders such as angina or cystic fibrosis, and compared to the general population, those who suffer from EDs have a significantly lower quality of life due to emotional problems, social isolation, and relationships at home (Jenkins, Rienecke Hoste, Meyer, and Blissett, 2011). Additionally, those with anorexia nervosa seemed to have the lowest of all quality of life scores when compared to other eating disorders, where they reported higher rates of suicidal ideation and suicide-related actions (Doll, Petersen, and Stewart-Brown, 2005). It appears a vicious cycle develops with untreated EDs, where anxiety and depression overlap with symptomology as well as onset. Though we did not distinguish between types of eating disorders in this research, it is important to understand the psychological impact, especially when treating patients. There is currently no research regarding eating

disorders in healthcare providers. However, literature does exist regarding physicians with mental illness., which can undoubtedly can effect patients (Pilowski, 1989). The author states the physician must heal their own mind and give help to themselves before healing others (Pilowski, 1989). The same could be translated to athletic trainers; is it truly ethical to continue treating patients when suffering from a mental illness as severe as an eating disorder? This is noteworthy and should be considered for future research. We will conclude our discussion on ATs and eating disorders with how failed dieting attempts can lead to them.

Failed Dieting and Eating Disorders.

The result of the total EDE-QS score and question 52 "How long did you keep the weight of" demonstrates that those who were unable to sustain weight loss for a year or longer were more likely to have a greater EDE-QS total score. No significant relationship was observed with those who retained weight loss greater than a year. Finally, those that did not participate in any kind of dieting were more likely to not have any kind of ED symptomology. This relates to currently literature which establishes that healthier weight-loss avenues, such as intuitive eating, predict better psychological and behavioral health, and therefore decrease disordered eating behaviors (Hazzard et al., 2020). Intuitive eating is characterized as the rejection of diet culture by eating based on physiological hunger and satiety rather than situation and emotional cues (Tylka, 2006). We know from our previous discussion that the more one diets, the greater the chance of developing disordered eating behavior or an ED (Heatherton and Polivy, 1992). It was established in chapter 2 how diets are often unsuccessful as a means of sustained weight-loss. In general populations, depression and hopelessness can develop as a result of these failures, which

is linked with body dissatisfaction and/or negative affect (Koenig and Wasserman, 1995). This then can lead to further pathogenic eating behaviors in order to regain a sense of control over physique (Koenig and Wasserman, 1995). This has not been studied in ATs. As a result, it appears, the best way for ATs to sustain weight-loss, while lowering the chance of developing an ED is to practice intuitive eating and stay away from diets.

Conclusions, Research Question Two

The results of both components of RQ2 present novel information as well results that are similar to previous studies. The first part of RQ2 discussed the impact of gender and dieting, as well as years certified as it pertains to age and dieting. We learned that females are more likely to participate in dieting, likely due to their negative views on obesity and greater desire to be thin than males. We also learned about major precursors in development of eating disorders, with one of the largest being diet culture. Secondly, we learned that those who are certified longer, are usually greater in age, and will most likely retain their weight loss longer. This is mostly likely due to YAs caring less about long term affects and older generations having a medical trigger that requires extended weight loss in order to improve lifespan and/or quality of life. Finally, we discovered novelty in the athletic training population in that dieting and disordered eating do have a relationship. This has been observed in other populations, but we are the first to observe it in athletic trainers. This may be a result of childhood experiences with obesity, social media, and/or co-morbidities such as anxiety and depression along with a pre-occupation of food and remaining thin. The next section will do a greater exploration on the impact the results of this study have on athletic trainers and what it means for the future.

Research Questions Three

The third research question, which asked about work ability in regard to BMI, gender, years certified setting, region, and type of work, was not viable for interpretation. Research question one demonstrated mental work demands placed on ATs, such as time conflict, long working hours, and non-traditional working hours. Work-family conflict is mitigated by having an environment with colleagues and administration that understand role demands and therefore modify scheduling for ATs and having enough personal time for self and having family that understands the demands placed on an AT (Pitney, Mazerolle, and Pagnotta, 2011). However, there is currently no studies relating physical work ability in athletic training, in relation to our independent variables. This question was going to bridge the gap in the literature between the demands placed on ATs, their health behaviors, and how they were both affected. As stated in chapter 3, those with a greater level of PA will have a greater level of work ability and those that have a greater BMI will have a lower level of work ability (Calatayud et al., 2015; Andersen, Izquierdo, and Sundstrup, 2017). Data regarding work environment did demonstrate most ATs consider their physical and mental work environment to be "good" or better, as demonstrated in Table 5.11(physical demands) and Table 5.12 (mental demands). This is a good foundation to knowing that ATs generally feel "good" about their work environment. However, the remaining data from the study demonstrates that although a work environment may be good, it is not enough to assist with healthier behaviors. In order to better assess this in the future, different statistical analyses such as chi square tests and decreasing the amount of item-responses may yield more robust results. This research creates the foundation of creating greater worksite health promotional research.

Based on Tables 5.11 and 5.12, it appears that more research is needed to assist in mental health demands, rather than physical.

Table 5.11

Work Demands, Physical

Rating	Frequency	Percent
Excellent	147	55.50
Very Good	89	33.60
Good	28	10.60
Fair	1	0.40
Poor	0	00

Table 5.12

Work Demands, Mental

Rating	Frequency	Percent
Excellent	82	30.90
Very Good	110	41.50
Good	54	20.40
Fair	18	6.80
Poor	1	0.40

Impact on Athletic Trainers

This study found that athletic trainers are participating in the recommended amount of physical activity. However, they are eating poorly and developing even poorer psychological symptoms as a result, which puts them at risk for eating disorders. It can be suggested that athletic trainers are trying to compensate for a poor diet, by exercising more. They are trying to "outrun a bad diet" as many professionals in the health and industry would call it. These results have also been observed by Torres-McGehee et al.

(2020). Though athletic trainers care for the "physically active" population, it appears they struggle with maintaining the same standards they preach (Craddock, Pignataro, and Daramola, 2016).

This challenge could be related to work-life balance and the guilt of needing to do everything correct with the patient as a result of perfectionism (Mazerolle, 2008; Mazerolle, 2018). Because of this selflessness, if ATs do not participate in self-rejuvenation strategies and may be at risk for burnout (Mazerolle, Myers, Walker, and Kirby, 2018). The effects of burnout can contribute to physical and mental symptoms including headache, weight concern, indigestion, fatigue, sleeplessness, irritability, depression (Oglesby, Gallucci, Wyveen, 2020). As investigated over various disciples, these symptoms can result in lack of motivation to keep up with health (Oglesby et al., 2020; Mazerolle et al., 2008; Mazerolle and Eason, 2018). Multiple studies have highlighted the demand secondary schools, division I, and professional sports place on the athletic trainer (Pitney, Mazerolle, Pagnotta, 2011; Mazerolle, Pitney, Casa, and Pagnotta 2011, Mazerolle et al., 2008, Mazerolle and Eason, 2018). For most, barriers include time commitment, with some in professional sports working, on average, 75-hour weeks, and being "on-call" for patients 24/7 (Mazerolle and Eason, 2018). This can result in numerous time conflicts and decrease work life balance (Mazerolle and Eason, 2018). Additionally, other theorized factors such as staffing patterns and flexibility over work schedules can contribute to this poor work life balance and lack of healthy behaviors (Mazerolle et al., 2008). We noticed that when comparing the frequencies of physical to mental work demands (Tables 5.11 and 5.12), that there were greater amounts of "fair" and "poor" when it came to mental work demands, indicating that ATs may be mentally

struggling. These contributors to burn-out are observed in numerous health care professions, including nurses and physicians (Yedida, Chou, Brownlee, Flynn, and Tanner, 2014; Roberts, Shanafelt, Dyrbye, and West, 2014).

Limitations and Future Research

Although this research demonstrated multiple significant outcomes and novelty in regard to dieting with ATs, it is not without limitations. In theory, we would like to believe that all self-reported information is accurate and honest, but in reality, we know this many not be the case. This may be especially true when entering weight and sensitive information, such as the EDE-QS. The questionnaire was over 60 questions which can cause fatigue and lack of adherence or early drop-out. Though BMI was user-friendly, it does not consider fat versus muscle volume and can be misleading. This was discussed in chapter 2, but is important to recognize this limitation as well. Finally, this study was originally comparing athletic trainers to sports medicine physicians, which would have demonstrated entirely different information. However, the organization that was to be used to measure sports medicine physician responses was unable to participate, resulting in a smaller population and a complete change of constructs.

While every study has its own limitations, but those limitations bring more insight for future studies. The EDE-QS looked at level of disordered eating, future research should explore specific type of ED that is present with this behavior. Research using actual activity trackers and more accurate assessments of BMI are also of consideration for future research, as they may produce more robust results.

Third, the results of this research could be used as a conduit for increasing worksite health promotion in athletic trainers and tracking the outcomes. This could

include using the data from this research to increase worksite health promotion programs where ATs work with incentives for good health measures (i.e. blood pressure, BMI, blood panels etc.). An incentive program could also provide baseline data of where else health could be improved. Data from this type of study could be useful in bridging the gap between work/life balance, health behaviors, and burnout in athletic trainers. The research and outcomes could be delivered via webinar or through national conferences in order to gather more interest. In addition to observing these statistics in professional athletic trainers, similar can be done for AT students. By starting at the source, implementing greater health mitigation strategies in protection and prevention, and measuring the progress and outcome through their tenure in an AT program, the health of ATs can potentially be improved for future generations and create a greater transition to practice.

Other future research ideas could include looking at previous sport participation in athletic trainers and how athletic retirement affects their body type and diet, and exploring more into diet and athletic training career settings. Finally, and most importantly, now that we have measured health behaviors in ATs, we need to look at the patient perceptions as a result of the poor behaviors that ATs exhibit. This will be done with a similar survey and snowball sampling method.

Conclusion

The results of this extensive research proved to fruitful and eye-opening. The largest piece of evidence observed is that though athletic trainers are taking some steps to better their health, they are not practicing what they preach. They are, indeed, trying to "outrun a bad diet." Though ATs meet the recommendations for PA levels, their diets are

poor and the risk for obesity and co-morbidities is eminent. The physical and mental consequences of poor health raise questions about the longevity of future ATs and the profession and the result of these poor health behaviors can lead to burnout and AT role strain (Torres-McGehee et al, 2020). This raises questions of, if the AT is experiencing burnout or role strain, what impact does that have on the patient? We need to be able to take care of those in our profession in order to provide better patient care.

REFERENCES

ACGME Program Requirements for Graduate Medical Education in Cardiovascular Disease (Internal Medicine). Retrieved from: https://www.acgme.org/Portals/0/PFAssets/ProgramRequirements/141_cardiovascular_disease_2017-07-01.pdf. Accessed March 20, 2020.

American Medical Society for Sports Medicine (AMSSM). (2020). https://www.amssm.org/

Adel, M., Akbar, R., & Ehsan, G. (2019). Validity and reliability of work ability index (WAI) questionnaire among Iranian workers; a study in petrochemical and car manufacturing industries. *Journal of Occupational Health*, 61(2), 165–174. https://doi.org/10.1002/1348-9585.12028

Akhtar, N., Zareen, H., and Sarmad. (2018). Eating habits and nutritional status of female students of a medical college of Lahore. *Annals of King Edward Medical University,* 24(1)

American College of Sports Medicine (ACSM). (2020). Historical Timeline. Retrieved from: https://www.acsm.org/acsm-membership/timeline

American Medical Society for Sports Medicine (AMSSM). (2020). What is a sports medicine specialist? Retrieved from: https://www.amssm.org/Content/pdf%20files/WhatisSMSpec-Patient-broch.pdf

American Psychiatric Association (APA). (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Washington, DC.

Andersen, L. L., Izquierdo, M., and Sundstrup, E. (2017). Overweight and obesity are progressively associated with lower work ability in the general working population: cross-sectional study among 10,000 adults. *International Arch Occupational Environmental Health*. 90, 779-787.

Angrave, D., Charlwood, A., and Wooden, M. (2015). *Journal of Epidemiology and Community Health.*

Araujo, C. G. (2016). The terms “athlete” and “exercisers.” *American College of Cardiology*.

Arganini C., Turrini A., Saba A., Virgili F., and Comitato R. (2012). Gender differences in food choice and dietary intake in modern western societies. *Public Health—Social and Behavioral Health*, 85–102.

Arscott, S. A. (2018). The elimination diet. *UW Integrative Health*, 1-10.

Barbosa-Salvidar, J. L., & Van Itallie, T. B. (1979). Semistarvation: An overview of an old problem. *Bulletin of the New York Academy of Medicine,* 55*,* 774-797.

Baute, V., Sampath-Kumar, R., Nelson, S., Basil, B. (2018). Nutrition education for health-care provider improves patient outcomes. Global Advances in Health and Medicine, 7, 1-3.

Bigotti, F., Taylor, D. (2017). The pulsilogium of Santorio: New light on technology and measurement in early modern medicine. *Soc Politica,* 11(2), 53-113.

Bleich, S.N., Bennett, W.L., Cooper, L.A. & Gudzune, K.A. (2012). Impact of physician BMI on obesity care and beliefs. *Obesity (Silver Spring)*, 20(5), 999-1005.

Bogossian, F.E., Hepworth, J., Leong, G.M., et al. (2012). A cross-sectional analysis of patterns of obesity in a cohort of working nurses and midwives in Australia, New Zealand, and the United Kingdom. *International Journal of Nursing Students*, 49, 727–38.

Boie, I., Lopez, A.L., Sass, D.A. (2012). An evaluation of a theoretical model predicting dieting behaviors: Tests of measurement and structural invariance across ethnicity and gender. *Measurement and Evaluation in Counseling and Development,* 46(20), 114-135.

Bonci, C. M., Bonci, L. J., Granger, L., R., Johnson, C. L., Malina, R. M., Milne, L. W., Ryan, R. R., Vanderblunt, E. M. (2008). National Athletic Trainers' Association position statement: Preventing, detecting, and managing disordered eating in athletes. *Journal of Athletic Training*, 43(1), 80-108.

Bonett, D. G. and Wright, T. A. (2015) Cronbach's alpha reliability: Interval estimation, hypothesis testing, and sample size planning. *Journal of Organizational Behavior*, 36, 3–15. doi: 10.1002/job.1960.

Booth, M.L. (2000). Assessment of physical activity: An international perspective. *Research Quarterly for Exercise and Sport*, 71(2), 114-120.

Bourke, J. (2012). The long history of dieting fads. *The Lancet*, 379, 994-995.

British Dietetic Association. (2014). Food Fact Sheet – Detox Diets. Retrieved from: https://www.bda.uk.com/foodfacts/detoxdiets

Budruk, M., Cowen, L.J., Yoshioka, C.F., and Kulinna, P. (2010). Physical activity participation constraints among athletic trainers: A profession based assessment. *Leisure/Loisr,* 33, 563-587.

Bulik, C.M. (2002). Anxiety, depression, and eating disorders. In: Fairburn, C.G., and Brownell, K.D. (Eds.) *Eating disorders and obesity A comprehensive handbook.* New York, NY: The Guilford Press.

Cai, W., Gao, Y., Yang, W., Cheng, F., Tang, D., and Li, L. (2018). Physical activity-related injury and its associated factors among middle school students in southern China. *International Journal of Environmental Research and Public Health,* 15, 1-12.

Calatayud, J., Jakobsen, M. D., Sundstrup, E., Casana, J., Andersen, L. L. (2015). Dose-response association between leisure time physical activity and work ability: Cross-sectional study among 3000 workers. *Scandinavian Journal of Public Health.*

Campbell, K., and Peebles, R. (2014). Eating disorders in children and adolescents: State of the art review. *Pediatrics*, 134(3), 582–592. doi:10.1542/peds.2014-0194

Canguilhem, G. (1943). The normal and the pathological. New York: Zone Books.

Carlson, J. (2014). Of the most common weight-loss programs, Weight Watchers, Jenny Craig, Nutrisystem, and Medifast, which is the most effective? 2014 Awards for Excellence in Student Research and Creative Activity Documents. 2. http://thekeep.eiu.edu/lib_awards_2014_docs/2

Cena, H., Stanford, F.C., Ochner, L., Fonte, M.L., Biino, G., De Guiseppe, R., Taveras, E., and Misra, M. (2017). Association of history of childhood-onset obesity and dieting with eating disorders. *Eating Disorders,* 25(3), 216-229.

Center for Disease Control (CDC). (2018). National obesity/weight status. Retrieved from: https://nccd.cdc.gov/dnpao_dtm/rdPage.aspx?rdReport=DNPAO_DTM.ExploreByLocation&rdRequestForwarding=Form

Center for Disease Control (CDC). (2018). Mortality in the United States, 2017. Retrieved from: https://www.cdc.gov/nchs/data/databriefs/db328-h.pdf

Center for Disease Control (CDC). (1999). Achievements in public health, 1900-1999: Healthier mothers and Babies. Retrieved from: https://www.cdc.gov/mmwr/preview/mmwrhtml/mm4838a2.htm

Center for Disease Control (CDC). (2012). Principles of epidemiology in public health practice. Atlanta, GA: CDC.

Central Intelligence Agency (CIA). (2020). Country comparison: Infant mortality rate. Retrieved from: https://www.cia.gov/library/publications/the-world-factbook/rankorder/2091rank.html

Chapman, S. (1995). Doctors who smoke. *BMJ: British Medical Journal*, 311(6998), 142-143.

Christakis, N.A., and Fowler, J.H. (2007). The spread of obesity in a large social network over 32 years. *The New England Journal of Medicine*. 357(4), 370–379.

Cohen, R., Newton-John, T., and Slater, A. (2020). The case for body positivity on social media: Perspectives on current advances and future directions. *Journal of Health Psychology*. https://doi.org/10.1177/1359105320912450

Colić Barić I, Šatalić Z, Lukešić Ž. (2003). Nutritive value of meals, dietary habits and nutritive status in Croatian niversity students according to gender. International journal of food sciences and nutrition. 54(6):473-84.

Collins, J. C., Bentz, J. E. (2009). Behavioral and psychological factors in obesity. *Journal of Lancaster General Hospital,* 4(4), 124-127.

Commission on Accreditation of Athletic Training Education (CAATE). (2019). 2020 standards for accreditation of professional athletic training programs master's degree programs. Retrieved from: https://caate.net/wp-content/uploads/2019/08/2020-Standards-Final-7-15-2019.pdf

Commission on Accreditation of Athletic Training Education (CAATE). (2020). About. Retrieved from: https://caate.net/about/

Committee on Improving the Health, Safety, and Well-Being of Young Adults (CIHSWBYA); Board on Children, Youth, and Families; Institute of Medicine; National Research Council. Young Adults in the 21st Century. Bonnie RJ, Stroud C, Breiner H, (Ed.) (2015). *Investing in the health and well-being of young adults*. National Academic Press: Washington, DC. https://www.ncbi.nlm.nih.gov/books/NBK284782/

Comrey, A. L., & Lee, H. B. (1992). A first course in factor analysis (2nd ed.). Lawrence Erlbaum Associates, Inc.
Conley, A., and Boardman, J.D. (2007). Weight overestimation as an indicator of disordered eating behaviors among young women in the United States. *International Journal of Eating Disorders*, 40, 441–445. DOI: 10.1002/eat
Conroy, M. B., Delichatsios, H. K., Hafler, J. P, Rigotti, N. A. (2004). Impact of preventive medicine and nutrition curriculum for medical students. *American Journal of Preventative Medicine*, 27(1), 77-80.
Costello, A.B., and Osborne, J.W. (2005). Best practices in exploratory factor analysis: four recommendations for getting the most from your analysis. *Practical Assessment, Research and Evaluation,* 10(7), 1-9.
Cuppett, M., and Latin, R. W. (2002). A survey of physical activity levels of certified athletic trainers. *Journal of Athletic Training,* 37(3), 281-285.
Cushing, H. (1903). On routine determinations of arterial tension in operating room and clinic. *Boston Medical and Surgical Journal,* 148, 250-256.
Craddock, J.C., Pignataro, R.M., and Daramola, C.O. (2016). Athletic Trainers and the national health agenda: Promotion health behavior change. *Clinical Kinesiology,* 70(4), 44-51.
Craig, C.L., Marshall, A.L., Sjostrom, M., Bauman, A.E., Booth, M.L., Ainsworth, B.E., Pratt, M., Ekelund, U., Yngve, A., Sallis, J.F., Oja. P. (2003). International physical activity questionnaire: 12-country reliability and validity. *Medicine & Scince Sports Exercise*, 35(8), 1381–1395
Cronbach, L.J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika,* 16**,** 297–334. https://doi.org/10.1007/BF02310555
Crow, S.J., Peterson, C.B., Swanson, S.A., Raymond, N.C., Specker, S. Eckert, E.D., and Mitchell, J.E. (2009). Increased mortality in bulimia nervosa and other eating disorders. *American Journal of Psychiatry*, 166, 1342-1346.
Dietary reference intake: Electrolytes and water. The National Academies of Science, Engineering, and Medicine. http://www.nationalacademies.org/hmd/Activities/Nutrition/DRIElectrolytes.aspx . Accessed March 21, 2020.
de Mestral, C., Mayén, A.-L., Petrovic, D., Marques-Vidal, P., Bochud, M., & Stringhini, S. (2017). Socioeconomic Determinants of Sodium Intake in Adult Populations of High-Income Countries: A Systematic Review and Meta-Analysis. American Journal of Public Health, 107(4), e1–e12.
Department of Commerce and Labor. (1910). Mortality Statistics. Washington DC: Government Printing Office. Retrieved from: https://www.cdc.gov/nchs/data/vsushistorical/mortstatbl_1910.pdf
De Ridder, D., Adriaanse, M., Evers, C., Verhoeven, A. (2014). Who diets? Most people and especially when they worry about food. *Appetite*, 80, 103-108.
Devries, S., Dalen, J.E., Eisenberg, D.M., et al. (2014). A deficiency of nutrition education in medical training. *American Journal of Medicine*, 127(9), 804-806.
Dietz, W. H. & Bellizzi, M. C. (1999) Introduction: The use of body mass index to assess obesity in children. *The American Journal of Clinical Nutrition*, 70(1), 123S-125S. https://doi.org/10.1093/ajcn/70.1.123s

Di Pasquale, M. (2019). A short history of the low-carbohydrate diet. *Bodybuilding.com.* Retrieved from: https://www.bodybuilding.com/fun/md66.htm

Doll, H.A., Petersen, S.E., and Stewart-Brown, S.L. (2005). Eating disorders and emotional and physical well-being: Associations between student self-reports of eating disorders and quality of life as measured by the SF-36. *Quality of Life Research*, 14, 705-717.

Drewnowski, A., Dwyer, J., King, J.C., Weaver, C.M. (2019). A proposed nutrient density score that includes food groups and nutrients to better align with dietary guidance. *Nutrition Reviews*, 77(6), 404–416.

Englander, R., Cameron, T., Ballard, A.J., Dodge, J., Bull, J., Aschenbrener, C.A. (2013). Toward a common taxonomy of competency domains for the health professions and competencies for physicians. Academic Medicine, 88(8), 1088-1094.

Evans, M. (2018). Keto diets: good, bad or ugly? *The Journal Of Physiology*, *596*(19), 4561

Fabrigar, L.R. Wegener, D.T., MacCallum, R. C., and Strahan, E.J. (1999). Evaluating the use of exploratory factor analysis in psychological research. *Psychological Methods,* 4, 272-299.

Fairburn, C. G., & Cooper, Z. (1993). The eating disorder examination. In C. G. Fairburn & G. T. Wilson (Eds.), *Binge eating: Nature, assessment, and treatment* (12th ed., pp. 317–360). New York: Guilford Press.

Fairburn, C. G., Cooper, Z., O'Connor, M. (2014). Eating Disorder Examination. (Edition 17.0D)

Ferreira, C., Pinto-Gouveia, J., and Duarte, C. (2013). Physical appearance as a measure of social ranking: The role of a new scale to understand the relationship between weight and dieting. *Clinical Psychology and Psychotherapy, 20, 55-66.*

Fiese, B. H. (2018) Time allocation and dietary hbits in the United State: Time for re-evaluation? *Physiology & Behavior*, 193, 205-208.

Flegal, K.M. & Graubard, B.I. (2009). Estimates of excess deaths associated with body mass index and other anthropometric variables. *Am. J. Clin. Nutr*., 89(4), 1213–1219.

Franko, D.L., Keel, P.K., Dorer, D.J., Blais, M.A., Delinsky, S.S., Eddy, K.T., Charat, V., Renn, R., and Herzog, D.B. (2004). What predicts suicide attempts in women with eating disorders? *Psychological Medicine*, 34, 843-853.

Frank, E., Segura, C. (2009). Health practices of Canadian physicians. *Canadian Family Physician*, 55, 810-811.e7.

Freedman, D.S., Horlick, M. and Berenson, G.S. (2013). A comparison of the Slaughter skinfold-thickness equations and BMI in predicting body fatness and cardiovascular disease risk factor levels in children. *American Journal of Clinical Nutrition*, 98(6), pp.1417–24.

Freedman, D.S., Katzmarzyk, P.T., Dietz, W.H., Srinivasan, S.R., and Berenson, G.S. (2009). Relation of body mass index and skinfold thicknesses to cardiovascular disease risk factors in children: the Bogalusa Heart Study. *American Journal of Clinical Nutrition.*, 90(1), 210–216.

Freeman, B., Kelly, B., and Vandevijvere, S. (2015). Young adults: beloved by food and drink marketers and forgotten by public health? *Health Promotion International*, 31, 954-961.

Fryar, C. D., Carroll, M. D., Ogden, C. L. (2016). Prevalence of overweight, obesity, and extreme obesity among adults aged 20 and over: United States, 1960-1962 through 2013-2014. *National Center for Health Statistics.*

Gakidou, E., Afshin, A., Abajobir, A.A., et al. (2017). Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990–2016: A systematic analysis for the Global Burden of Disease Study 2016. *Lancet*. 390,1345-1422.

Gallagher, D., Visser, M., Sepulveda, D., Pierson, R. N., Harris, T., and Hymsfield S. B. (1996) How useful is body mass index for comparison of body fatness across age, sex, and ethnic groups? *American Journal of Epidemiology,* 143(3), 228-239.

Garabed, E. (2008). Adolphe Quetelet (1796-1874)-The average man and indices of obesity. *Nephrology Dialysis Transplantation*, 23(1), 47-51.

Gardiner-Shires, A., and Mensch, J. (2009). Attractors to an athletic training career in the high school setting. *Journal of Athletic Training,* 44(3), 286-293.

Garrow, J.S. & Webster, J. (1985). Quetelet's index (W/H2) as a measure of fatness. *Int. J. Obes*., 9(2), pp.147–153.

Gates, D.M., Succop, P., Brehm, B. J., Gillespie, G.L., Sommers, B.D. (2008). Obesity and presenteeism: the impact of body mass index on workplace productivity. *J Occup Environ Med,* 50(1), 39-45.

George, D., and Mallery, P. (2003). SPSS for Windows step by step: A simple guide and reference. 11.0 update (4th ed.). Boston: Allyn & Bacon.

Geraets, S. E. W., Meuffels, D. E., van Meer, B. L., Breedveldt Boer, H. P., Bierma-Zeinstra, S. M. A., & Reijman, M. (2015). Diagnostic value of medical history and physical examination of anterior cruciate ligament injury: comparison between primary care physician and orthopaedic surgeon. *Knee Surgery, Sports Traumatology, Arthroscopy: Official Journal Of The ESSKA*, *23*(4), 968–974.

Gibson A. M., Cohen, G. W., Boyce, K. K., Houston, M. N., Welch Bacon, C. E. (2016). Personal and environmental characteristics associated with burnout in athletic trainers: A critically appraised topic. *International Journal of Athletic Training and Therapy,* 21(1), 5-13.

Gideon, N., Hawkes, N., Mond, J., Saunders, R., Tchanturia, K., Serpell, L. (2016) Development and psychometric validation of the EDE-QS, a 12 item short form of the eating disorder examination questionnaire (EDE-Q). *PLoS ONE*, 11(5).

Gill, L.E., Bartels, S.J., and Batsis, J.A. (2015). Weight Management in Older Adults. *Current Obesity Reports*, 4(3), 379–388. https://doi.org/10.1007/s13679-015-0161-z

Goacher, P. J., Lamber, R., and Moffatt, P. G. (2012). Can weight-related health risk be more accurately assessed by BMI, or by gender specific calculations of Percentage Body Fatness? *Medical Hypothesis,* 79, 656-662.

Godin, G. (2011). The Godin-Shepard Leisure-Time Physical Activity Questionnaire. *Health & Fitness Journal of Canada*. 4(1), 19-22.

Gorin, A.A., Phelan, S., Wing, R.R., and Hill, J.O. (2005). Promotion long-term weight control: does dieting consistency matter? *International Journal of Obesity and Related Metabolic Disorders,* 28(2), 278-281.

Greenhaus, J.H., and Powell, G.N. (2006). When work and family are allies: a theory of work- family enrichment. *Academy of Management Review*, 31,72-92.

Groth, J. J, Ayers, S. F. Miller, M. G., Arbogast, W. D. (2008). Self-reported health and fitness habits of certified athletic trainers. *Journal of Athletic Training*, 43(6), 617-623.

Gunes Bayir, A., Guclu, D. (2018). Nutritional assessment and physical activity of the departments for nutrition & dietetics and nursing students at a Foundation university. *Bezmialem Science*, 7(2), 132-137.

Grygiel-Go´rniak, B., Tomczak, A, Krulikowska, N., Przysławski, J., Seraszek-Jaros, A., Kaczmarek, E., (2016) Physical activity, nutritional status, and dietary habits of students of a medical university. *Sport Science Health*, 12, 261-267.

Hamilton, M.T., Healy, G.N., Dunstan, D.W., Zedric, T.W., and Owen, N. (2008). Too little exercise and too much sitting; Inactivity physiology and the need for new recommendations on sedentary behavior. *Current Cardiovascular Risk Reports,* 2, 292-298.

Hart, P.D. (2017). Test-retest stability of four common body composition assessments in college students. *Journal of Physical Fitness, Medicine, & Treatment in Sports,* 1(2), 1-4. doi: 10.19080/JPFMTS.2017.01.555561

Hazzard, V.M., Telke, S.E., Simone, M., Anderson, L.M., Larson, N.I., and Neumark-Sztainer, D. (2020). Intuitive eating longitudinally predicts better psychological health and lower use of disordered eating behaviors: findings from EAT 2010–2018. *Eating Weight Disorders,* https://doi.org/10.1007/s40519-020-00852-4

Health Research Funding. (2014). Pros and Cons of Fad Diets. Retrieved from: http://healthresearchfunding.org/pros-cons-fad-diets/

Heatherton, T. F., and Polivy, J. (1992). Chronic dieting and eating disorders: A spiral model. In J. H. Crowther, D. L. Tennenbaum, S. E. Hobfoll, & M. A. P. Stephens (Eds.), *Series in applied psychology: Social issues and questions. The etiology of bulimia nervosa: The individual and familial context* (p. 133–155). Hemisphere Publishing Corp: Washington, DC.

Helfand, B. J. Mukamal, K. J. (2012). Healthcare and lifestyle practices of healthcare works: Do healthcare workers practice what they preach? *Journal of the American Medical Association.* 173(3) 242-244.

Herzog, D.B., Keller, M.B., Sacks, N.R., Yeh, C.J., and Lavori, P.W. (1992). Psychiatric comorbidity in treatment-seeking anorexics and bulimics. *Journal of the American Academy of Child & Adolescent Psychiatry*, 31, 810-818.

Higgins, M. M. (2016). A quantitative examination of burnout in athletic training at the NCAA Division III. *Dissertation.*

Himmelstein, A., Scheiner, M. (1951). The cardiotachoscope. *Anesthesiology,* 13, 62-64.

Human Development Index (2017). Retrieved from: https://www.nationsonline.org/oneworld/human_development.htm

Hurst, Y., Fukuda, H. (2018). Effects of changes in eating speed on obesity in patients with diabetes: A secondary analysis of longitudinal health check-up data. *BMJ Open*, 8(1), 1-8.

Ilmarien, J., Tuomi, K. (1992). Work ability of aging workers. *Scandinavian Journal of Work and Environmental Health*. 18(2), 8-10.

Institute of Medicine (US) Subcommittee on Military Weight Management. (2004). Weight management: State of the science and opportunities for military programs.

Washington (DC): *National Academies Press* (US); Factors That Influence Body Weight. Available from: https://www.ncbi.nlm.nih.gov/books/NBK221834/

International Federation of Sports Medicine (FIMS) (2020). Our history. Retrieved from: https://www.fims.org/about/our-history/

Iorga, M., Dondas, C., Zugun-Eloae, C. (2018). Depressed as freshmen, stress as seniors: the relationship between depression, perceived stress and academic results among medical students. *Behavioral Sciences, 8*(70), 1-12.

Jenkins, P.E., Rienecke Hoste, R., Meyer, C., and Blissett, J.M. (2011). Eating disorders and quality of life: a review of the literature. *Clinical Psychology Review*, 31(1), 113-121. https://doi.org/10.1016/j.cpr.2010.08.003

Jezewska-Zychowicz M., Gawecki J., Wadolowska L., Czarnocinska J., Galinski G., KollajtisDolowy A., Roszkowski W., Wawrzyniak A., Przybylowicz K., Krusinska B., Hawrysz I., Slowinska M.A., Niedzwiedzka E. (2017). Dietary Habits and Nutrition Beliefs Questionnaire for people 15-65 years old, version 1.1. – interviewer administered questionnaire. *Chapter 1. (in:) Dietary Habits and Nutrition Beliefs Questionnaire and the manual for developing of nutritional data*. Ed. Gawecki J. The Committee of Human Nutrition, Polish Academy of Sciences, Olsztyn, 3-20. Available at: http://www.knozc.pan.pl/

Johnson, L. (2015). The religion of ethical veganism. *Journal of Animal Ethics*, 5(1), 31-68. doi:10.5406/janimalethics.5.1.0031

Johnston, R., and Valentinuzzi, M. (2013). Spirometry: A historical gallery up to 1905. *IEEE Pulse.* Retrieved from: https://pulse.embs.org/january-2014/spirometry-a-historical-gallery/

Jones, N. L. (2011). *The ins and outs of breathing How we learnt about the body's most vital function*. Bloomington, IN: IUniverse.

Kanter, R., and Caballero, B. (2012). Global gender disparities in obesity: a review. Advances in nutrition (Bethesda, Md.), 3(4), 491–498. https://doi.org/10.3945/an.112.002063

Keel, P.K., and Forney, K.J. (2013). Psychosocial risk factors for eating disorders. *International Journal of Eating Disorders*, 46, 433-439.

Kliem, K. E., Humphries, D. J., Markey, O., Vasilopoulou, D., Fagan, C. C., Grandison, A. S., Jackson, K. G., Todd, S., Givens, D. I., Lovegrove, J. A. (2019). Food chain approach to lowering the saturated fat of milk and diary products. *International Journal of Dairy Technology*, 72(1), 100-109.

Kellett, J., and Sebat F. (2017). Make vital signs great again – A call for action. *European Journal of Internal Medicine,* 45, 13-19.

Kotter, T., Tautphaus, Y, Obst, K.U., Voltmer, E., and Scherer, M. (2016). Health-promotion factors in freshman year of medical school: A longitudinal study. *Medical Education, 50*(6) 646-656.

Kuan, P.X., Ho, H.L., Shuhaili, M.S., Siti, A.A., Gudum, H.R. (2011). Gender differences in body mass index, body weight perception and weight loss strategies among undergraduates in Universiti Malaysia Sarawak. *Malaysian Journal of Nutrition*. 17(1), 67-75. PMID: 22135866.

Kudel, I., Huang, J. C., Ganguly, R. (2018). Impact of obesity on work productivity in different US occupations. *Journal of Occupational and Environmental Medicine,* 60(1), 6-11_.

Kushner, R. F. (1995). Barriers to providing nutrition counseling by physicians: A survey of primary care practitioners. *Preventative Medicine*, 24, 546-552).
Khawandanah, J., and Tewfik, I. (2016). Fad diets: Lifestyle promises and health challenges. *Journal of Food Research*, 5(6), 80-94.
Koenig, L. J. and Wasserman, E. L. (1995). Body image and dieting failure in college men and women: Examining links between depression and eating problems. *Sex Roles,* 32(3/4), 226-249.
Kowalkowska, J., Wadolowska, L., Czarnocinska, J., Czlapka-Matyasik, M., Galinski, G., Jezewska-Zychowicz, M., Bronkowska, M., Dlugosz, A., Loboda, D., and Wyka, J. (2018). Reproducibility of a Questionnaire for Dietary Habits, Lifestyle and Nutrition Knowledge Assessment (KomPAN) in Polish Adolescents and Adults. *Nutrients*, 10(12), 1845. https://doi.org/10.3390/nu10121845
Kyle R.G., Neall R.A., and Atherton I.M. (2016). Prevalence of overweight and obesity among nurses in Scotland: a cross-sectional study using the Scottish Health Survey. *Int J Nurs Stud*, 53, 126–33.
Kyle, R. G., Wills, J., Mahoney, C., Hoyle, L., Kelly, M., and Atherton, I. M. (2017). Obesity prevalence among healthcare professionals in England: a cross-sectional study using the Health Survey for England. *BMJ open*, 7(12), e018498. https://doi.org/10.1136/bmjopen-2017-018498
Lambert, V. (2019). Why doctors are prescribing exercise instead of pills. *Daily Telegraph (London)*, 19. Retrieved from https://search-ebscohost-com.argo.library.okstate.edu/login.aspx?direct=true&db=n5h&AN=8Q2154653574&site=ehost-live
The Lancet. (2009) What is health? The ability to adapt. 373: 781.
Lawlor, D.A. et al. (2010). Association between general and central adiposity in childhood, and change in these, with cardiovascular risk factors in adolescence: prospective cohort study. *BMJ*, 341, p.c6224.
LaRose, J.G., Leahey, T.M., Hill, J.O., and Wing, R.R. (2013). Differences in motivations and weight loss behaviors in young adults and older adults in the National Weight Control Registry. *Obesity*, 21(3), 449–453. https://doi.org/10.1002/oby.20053
Lealand Moore, J., (2002). The experience and process of the working alliance in collegiate athletic training. *Dissertation.*
Leech, R.M., Worsley, A., Timperio, A., McNaughton, S.A. (2015). Characterizing eating patterns: a comparison of eating occasion definitions, American Journal of Clinical Nutrition, 102(5), 1229–1237, http://dx.doi.org/10.3945/ajcn.115.114660.
Liechty, J.M., and Lee, M. (2013). Longitudinal predictors of dieting and disordered eating among young adults in the US. *International Journal of Eating Disorders*, 46(8), 790-800.
Linn, L.S., Yager, J., Cope, D., and Leake, B. (1886). Health habits and coping behaviors among practicing physicians. *West J Med*, 144(4), 484–489.
Lobelo, F., and de Quevedo, I. G. (2016). The evidence in support of physicians and health care providers as physical activity role models. *American Journal of Lifestyle Medicine*, 10(1), 36-52.
Lockwood, C., Conroy-Hiller, T., and Page, T. (2004). Vital Signs. *JBI Reports,* 2, 207-230.

Lombardi, N.J., Tucker, B., Freedman, K.B., Austin, L.S., Eck, B., Pepe, M, and Tjoumakaris, F.P. (2016). Accuracy of athletic trainer and physician diagnosis in sports medicine. *Orthopedics,* 39(5), 944-949.

Mabe, A. G., Forney, K. J., and Keel, P. K. (2014). Do you "like" my photo? Facebook use
maintains eating disorder risk. *International Journal of Eating Disorders*, 47(5), 516–523. doi:10.1002/eat.v47.5

Mackowiak, P. A., Wasserman, S. S., and Levine, M. M. (1992). A critical appraisal of 98.6 degrees Fahrenheit, The upper limit of the normal body temperature, and other legacies' of Carl Reinhold August Wunderlich. *Journal of the American Medical Association,* 268(12), 1578-1580.

Maguen, S., Hebenstreit, C., Li, Y., Dinh, J. V., Donalson, R., Dalton, S., Rubin, E., and Masheb, R. (2018). Screen for disordered eating: Improving the accuracy of eating disorder screening in primary care. General Hospital Psychiatry, 50, 20-25. Mancini, M., and Stamler, J. (2004). Diet for preventing cardiovascular diseases: Light from Ancel keys, distinguished centenarian scientist. *Nutriona and Metabolic Cardiovascular Disease,* 14, 52-57.

Manios, Y., Panagiotakos, D.B., Pitsavos, C., Polychronopoulos, E., and Stefanadis, C. (2005). Implication of socio-economic status on the prevalence of overweight and obesity in Greek adults: the ATTICA study. *Health Policy*, 74, 224–232

Maracason, W. (2011). Is there evidence to support the claim that a gluten-free diet should be used for weight loss? *Journal of the American Dietetic Association*, 111(11), 1786.

Mazerolle, S.M., Bruening, J.E., and Casa, D.J. (2008). Work-family conflict, part I: Antecedents of work-family conflict in national collegiate athletic association division I-A certified athletic trainers. *Journal of Athletic Training,* 43(5), 505-512.

Mazerolle, S.M., and Eason, C.M. (2015). Perceptions of national collegiate athletic association division I female athletic trainers on motherhood and work-life balance: individual- and sociocultural-level factors. *Journal of Athletic Training,* 60(8), 854-861.

Mazerolle, S.M., and Eason, C. (2018). Recommendations for enhancing work-life balance of the athletic trainer: Making it personal. *Athletic Training & Sports Health Care,* 10(2), 60-63.

Mazerolle, S.M. and Hunter, C. (2018). Work-life balance in professional sports setting: The athletic trainer's perspective. *International Journal of Athletic Therapy and Training,* 23, 141-149.

Mazerolle, S.M., Myers, S.L., Walker, S., and Kirby, J.K. (2018). Maintaining professional commitment as a newly credentialed athletic trainer in the secondary school setting. *Journal of Athletic Training,* 53(3), 312-319.

Mazerolle, S. M., Pitney, W. A., Casa, D. J., and Pagnotta, K. D. (2011). Assessing strategies to manage work and life balance of athletic trainers working in the National Collegiate Athletic Association Division I setting. *Journal of Athletic Training, 46*(2), 194–205. https://doi.org/10.4085/1062-6050-46.2.194

Menzies, R. D., and Young, R. A. (2011). Referrals from a primary care-based sports medicine department to an orthopaedic department: a retrospective cohort study. *British Journal of Sports Medicine*, *45*(13), 1064–1067.

McLaine, A. J. (2005). An overview of burnout in athletic trainers. *Athletic Therapy Today,* 10(16), 11-13.

Micali, N., De Stavola, B., Ploubidis, G., Simonoff, E., Treasure, J., and Field, A.E. (2015). Adolescent eating disorder behaviours and cognitions: Gender-specific effects of child, maternal and family risk factors. *The British Journal of Psychiatry: The Journal of Mental Science*, 207(4), 320–327. doi:10.1192/bjp.bp.114.152371

Morgan, J. F., Reid, F., and Lacey, J. H. (2000). The SCOFF questionnaire: a new screening tool for eating disorders. *The Western Journal of Medicine*, 172(3), 164–165. https://doi.org/10.1136/ewjm.172.3.164

Morrow, J. R., Jr, Defina, L. F., Leonard, D., Trudelle-Jackson, E., and Custodio, M. A. (2012). Meeting physical activity guidelines and musculoskeletal injury: the WIN study. Medicine and science in sports and exercise, 44(10), 1986–1992. doi:10.1249/MSS.0b013e31825a36c6

Murakami E, and Young J. (1997). Daily travel by persons with low income. Nationwide Personal Transportation Survey Symposium. Washington, DC.

Myatt, R. (2014). An overview of cardiac risk in patients with chronic eating disorders. *British Journal of Cardiac Nursing*, 9(6), 287-291.

Myrick, J. G., and Erlichman, S. (2020). How audience involvement and social norms foster vulnerability to celebrity-based dietary misinformation. *Psychology of Popular Media*, 9(3), 367–379. https://doi.org/10.1037/ppm0000229

NATA News. (2013). AT Profile: C. David Burton, AT for Cirque du Soleil. Retrieved from: https://www.nata.org/sites/default/files/professional-interests-performing-arts-cirque-du-soleil-profile.pdf

National Cancer Institute (2012). Diet History Questionnaire, Version 2.0 *National Institutes of Health, Epidemiology and Genomics Research Program, National Cancer Institute.*

National Research Council and Institute of Medicine. (2013). U.S. Health in International Perspective: Shorter Lives, Poorer Health. Panel on Understanding Cross-National Health Differences Among High-Income Countries, Steven H. Woolf and Laudan Aron, Eds. Committee on Population, Division of Behavioral and Social Sciences and Education, and Board on Population Health and Public Health Practice, Institute of Medicine. Washington, DC: The National Academies Press.

Neumark-Sztainer, D., Wall, M., Larson, N. I., Eisenberg, M. E., and Loth, K. (2011). Dieting and disordered eating behaviors from adolescence to young adulthood: Findings from a 10-year longitudinal study. *Journal of the American Dietetic Association*, 111(7), 1004– 1011. doi:10.1016/j.jada.2011.04.012

Nisar N, Qadri M, Fatima K, and Perveen S. (2008). Dietary habits and life style among the students of a private medical university Karachi. JPMA The Journal of the Pakistan Medical Association.;58(12):687-90.

Nutrition and You: Trends 2008.; 2008. https://www.eatrightpro.org/~/media/eatrightpro files/media/trends and reviews/nutrition and you/trends_2008_are_you_already_doing_it.ashx. Accessed March 20, 2020.
Nuttall, F. Q. (2015). Body mass index: Obesity, BMI, and health: A critical review. *Nutrition Today,* 50(3), 117-128. https://doi.org/10.1097/NT.0000000000000092
Oberg, E. B., and Frank, E. (2009). Physicians' health practices strongly influence patient health practices. *J R Coll Physicians Edinb,* 39(4): 290-291.
Obert, J., Pearlman, M., Obert, L., and Chapin, S. (2017). Popular weight loss strategies: A review of four weigh loss techniques. *Current Gastroenterol Reports*, 19(61), 1-4.
Oglesby, L.W., Gallucci, A.R., and Wynveen, C.J. (2020). Athletic trainer burnout: A systematic review of the literature. *Journal of Athletic Training,* 55(4), 416-430.
O'Hara, L., Tahboub-Schulte, S., & Thomas, J. (2016). Weight-related teasing and internalized weight stigma predict abnormal eating attitudes and behaviours in Emirati female university students. *Appetite*, 102, 44–50. doi:10.1016/j.appet.2016.01.019
Okorodudu, D.O., Jumean, M.F., Montori, V.M., Romero-Corral, A., Somers, V.K., Erwin, P.J., and Lopez-Jimenez, F. (2010). Diagnostic performance of body mass index to identify obesity as defined by body adiposity: A systematic review and meta analysis. *International Journal of Obesity*,34, 791-799. doi: 10.1038/ijo.2010.5
O'Sullivan AJ. (2009). Does oestrogen allow women to store fat more efficiently? A biological advantage for fertility and gestation. *Obesity Reviews*. 10(2), 168-77. doi: 10.1111/j.1467-789X.2008.00539.x.
Oppenheim, M. (2018). Kim Kardashian criticized for promoting 'appetite suppressant' lollipops. *The Independent*. Retrieved from: https://www.independent.co.uk/news/world/americas/kim-kardashian-lollipops-appetite-suppressant-diet-flat-tummy-co-outrage-a8353831.html
Patricia, W.C. and Arnold, E.A. (2002). Body Image: A handbook of theory, research and clinical practice. Thomas FC & Thomas P (eds). New York, NY: The Guilford Press. pp. 183-191
Petkov, P. (2019). Nutritional habits and physical activity of students. *Trakia Journal of Sciences*, 17(1), 813-820.
Phelan, S.M., Burgess, D.J., Griffin, J.M., Hellerstedt, W.L., Van Ryn, M. and Yeazel, M.W. (2015). Impact of weight bias and stigma on quality of care and outcomes for patients with obesity. *Obesity Reviews*, 16(4), 319-26.
Pilowski, L. (1989). Mental Illness in Doctors. *British Medical Journal,* 298, 269-270.
Pitney, W.A., Mazerolle, S.M., and Pagnotta, K.D. (2011). Work-family conflict among athletic trainers in the secondary school setting. *Journal of Athletic Training,* 46(2), 185-193.
Polivy, J. (1996). Psychological consequences of food restriction. *Journal of the American Dietetic Association*, 96(6), 589-592. http://dx.doi.org/10.1016/S0002-8223(96)00161-7
Prentice, W. E. (2017). Principles of athletic training: a guide to evidence-based clinical practice, sixteenth edition. New York, NY: McGraw-Hill Education.

Puhl, R.M. and Heuer C.A. (2010). Obesity stigma: Important considerations for public health. *American Journal of Public Health*, 100(6), 1019-28.

Rees-Punia, E., Evans, E.M., Schmidt, M.D., Gay, J.L., Matthews, C.E., Gapstur, S.M., and Patel, A.V. (2019). Mortality risk reductions for replacing sedentary time with physical activities. *American Journal of Preventative Medicine*. 56(5), 736-741.

Rienzi, G. 2012. Pledging wellness. Johns Hopkins university gazette.

Roberts, D.L., Shanafelt, T.D., Dyrbye, L.N., and West, C.P. (2014). A national comparison of burnout and work-life balance among internal medicine hospitalists and outpatient general internists. *Journal of Hospital Medicine*, 9(3),176–181.

Roguin, A. 2006. Rene Theophile Hyacinthe Laennec (1781-1826): The man behind the stethoscope. *Clinical Medicine & Research,* 4(3) 230-235.

Roguin, A. 2006. Scipione Riva-Rocci and the men behind the mercury sphygomomanometer. *The International Journal of Clinical Practice,* 60(1), 73-39.

Ross, C.A., Caballero, B., Cousins, R., Tucker, K., and Ziegler, T. (2014). *Modern Nutrition in Health and Disease, 11th Edition*. Baltimore, MD: Lippincott Williams and Wilkins.

Rounsefell, K., Gibson, S., McLean, S., Blair, M., Molenaar BNutSc, A., Brennan, L., Truby, H., and McCaffrey, T. A. (2019). Social media, body image and food choices in healthy young adults: A mixed methods systematic review. *Nutrition and Dietetics,* 77, 19-40.

Russell, C. 2012. Doctors, practice what you preach. Boston, MA: The Atlantic.

Sahay, M., and Sahay, R. (2014). Hyponatremia: A practical approach. *Indian Journal of Endocrinology and Metabolism*, 18(6), 760–771. https://doi.org/10.4103/2230-8210.141320

Sammarone Turocy, P., De Palma, B.F., Horswill, C.A., Laquale, K.M., Martin, T.J., Perry, A.C., Somova, M.J., and Utter, A.C. (2011). National athletic trainers' association position statement: safe weight loss and maintenance practices in sport and exercise. *Journal of Athletic Training,* 46(3), 322-336.

Saleem, M., Sattar, S., Zafar, M., and Bin Ismail, R. (2014). Link between eating disorders and depression. *Pakistan Journal of Commerce and Social Sciences,* 8(3), 925-937.

Sartorius, N. (2006). The meanings of health and its promotion. *Croatian Medical Journal*, 47(4), 662–664.

Schilling, J., Pitney, W.A., and Mazerolle, S.M. (2014). Experiences of athletic trainers in the industrial setting. *International Journal of Athletic Therapy and Training.* 19(3), 20-25.

Severinghaus, J. (2007). Takuo Aogyagi: Discovery of pulse oximetry. *Anesthesia & Analgesia,* 105(6), S1-S4.

Shanley, E., Thigpen, C. A., Chapman, C. G., Thorpe, J., Gilliland, R. G., and Sease, W. F. (2019). Athletic trainers' effect on population health: Improving access to and quality of care. *Journal of Athletic Training,* 54(2): 124-132.

Sharma, S.K., Mudgal, S.K., Thakur, K., Gaur, R., and Aggarwal, P. (2020). Lifestyle behavior of budding health care professionals: A cross-sectional descriptive study. *Journal of Family Medicine and Primary Care,* 9, 3525-3531.

Short, S. E., and Mollborn, S. (2015). Social determinants and health behaviors: Conceptual frames and empirical advances. *Current Opinion in Psychology, 5*, 78–84. https://doi.org/10.1016/j.copsyc.2015.05.002

Sidiropoulos, M. (2007). Anorexia nervosa: The physiological consequences of starvation and the need for primary prevention efforts. *McGill Journal of Medicine*, 10(1), 20–25.

Smink, F.R.E., van Hoeken, D., and Hoek, H. W. (2012). Epidemiology of eating disorders: incidence, prevalence and morality rates. *Curr Psychiatry Rep,* 14, 406-414.

Smith Rockwell, M., Nickols-Richardson, S. M., and Thye F. W. (2001). Nutrition knowledge, opinions and practices of coaches and athletic trainers at a division I university. *International Journal of Sport Nutrition and Exercise Metabolism*, 11, 174-185.

Smolin, L.A., Grosvenor, M.B. (2013). *Nutrition: Science and Applications, 3rd Edition*. Hoboken, NJ: John Wiley & Sons, Inc.

Speark, B.A. (2006). Does dieting increase the risk for obesity and eating disorders? *Journal of the American Dietetic Association,* 106(4), 523-525.

Stanek, J., Rogers, K., Anderson, J. (2015). Physical activity participation and constraints among athletic training students. *Journal of Athletic Training.* 50(2) 163-169.

Steinberger, J. et al. (2005). Comparison of body fatness measurements by BMI and skinfolds vs dual energy X-ray absorptiometry and their relation to cardiovascular risk factors in adolescents. *Int. J. Obes.,* 29(11),1346–1352.

Stice, E., Ng, J., and Shaw, H. (2010). Risk factors and prodromal eating pathology. *Journal of Child Psychology and Psychiatry*, 51(4), 518–525. doi:10.1111/j.1469-7610.2010.02212.x

St-Onge, M.P., Ard,J., Basin, M.L., Chiuve, S.E., Johnson, H.M., Kris-Etherton, P., Varady, K. (2017). Meal timing and frequency: Implications for cardiovascular disease prevention: A scientific statement from the American Heart Association. *American Heart Association*,135(9), 96-121. doi: 10.1161/CIR.0000000000000476.

Subar, A.F. Thompson, F.E., Kipnis, V., Midthune, D., Hurwitz, P., McNutt, S., McIntosh, A., Rosenfeld, S. (2001). Comparative validation of the Block, Willett, and National Cancer Institute food frequency Questionnaires: The eating at America's table study. *American Journal of Epidemiology,* 154(12), 1089-1099.

Sun, Q. et al. (2010). Comparison of dual-energy x-ray absorptiometric and anthropometric measures of adiposity in relation to adiposity-related biologic factors. *Am. J. Epidemiol*., 172(12), 1442–1454.

Teleman, A.A., de Waure, C., Soffiani, V., Poscia, A., Di Peietro M.L. (2015). Nutrtiona habits in Italian university students. *Ann 1st Sanita*, 51(2), 99-105.

Tiggemann, M., Gardiner, M., Slater, A. (2000). "I would rather be size 10 than have straight A's": A focus group study of adolescent girls' wish to be thinner. *Journal of Adolescence*, 23, 645-659.

Torres-McGehee, T.M., Emerson, D.M., Moore, E.M., Walker, S., Pritchett, K., Smith, A.B., Lyles, T. A., Wakefield, G., and Ohlemeyer, K. (2020). Examination of energy balance, eating disorder risk, and pathogenic behaviors among athletic trainers. *Journal of Athletic Training.*

Torres-McGehee, T.M., Pritchett, K.L, Zippel, D., Minton, D.M., Cellamare, A., Sibilia, M. (2012). Sports nutrition knowledge among collegiate athletes, coaches, athletic trainers, and strength and conditioning specialist. *Journal of Athletic Training,* 47(2), 205-211.

Tylka, T. L. (2006). Development and psychometric evaluation of a measure of intuitive eating. *Journal of Counseling Psychology, 53*(2), 226–240. https://doi.org/10.1037/0022-0167.53.2.226

U.S. Department of Health and Human Services (USHHS). (2015) Dietary Guidelines for Americans. 8th Edition. Washington, DC: USDHHS. Retrieved from: https://health.gov/our-work/food-and-nutrition/2015-2020-dietary-guidelines/.

US Department of Health and Human Services (USDHHS). (2018). Physical Activity Guidelines for Americans, 2nd Edition. Washington, DC: USDHHS. Retrieved from: https://health.gov/sites/default/files/2019-09/Physical_Activity_Guidelines_2nd_edition.pdf

Uccula A., and Nuvoli G. (2017). Body perception and meal type across age and gender on a Mediterranean island (Sardinia). *Psychological Health Medicine*, 22, 1210–1216. 10.1080/13548506.2017.1307997

Van Domelen, D.R., Koster, A., Caserotti, P., Brychta, R.J., Chen, K.Y., McClain, J.J., Troiano, R.P., Berrigan, D., and Harris, T.B. (2011). Employment and physical activity in the U.S. *American Journal of Preventive Medicine*, 41(2), 136–145. https://doi.org/10.1016/j.amepre.2011.03.019

Van Mol, C. (2017). Improving web survey efficiency: the impact of an extra reminder and reminder content on web survey response. *International Journal of Social Research Methodology*, 20(4), 317-327, DOI: 10.1080/13645579.2016.1185255

Venus Jin, S., and Ryu, E. (2020). "I'll buy what she's #wearing": The roles of envy toward and parasocial interaction with influencers in Instagram celebrity-based brand endorsement and social commerce. *Journal of Retailing and Consumer Services*, 55. https://doi.org/10.1016/j.jretconser.2020.102121

Vera Cruz, J. (2013). Inside the military setting. NATA News. Retrieved from: https://www.nata.org/sites/default/files/professional-interests-military-marines-nata-news.pdf

Vetter, M.L., Herring, S.J., Sood, M., Shah, N.R., Kalet, A.L. (2008). What do resident physicians know about nutrition? An evaluation of attitudes, self-perceived proficiency and knowledge. Journal of American College of Nutrition, 27(2), 287-298.

Villareal, D.T., Apovian, C.M., Kushner, R.F., and Klein, S. (2005). American Society for N, Naaso TOS Obesity in older adults: technical review and position statement of the American Society for Nutrition and NAASO, The Obesity Society. *Obesity Research*, 13(11),1849–1863.

Voils, C.I., Grubber, J.M., McVay, M.A., Olsen, M.K., Bolton, J., Gierisch, J.M., Taylor, S.S., Maciejewski, M.L., and Yancy Jr., W.S. (2016). Recruitment and retention for a weight loss maintenance trail involving weight loss prior to randomization. *Obesity Science and Practice,* 355-365.

Walseth, K., and Tidslevold, T. (2020). Young women's constructions of valued bodies: Healthy, athletic, beautiful, and dieting bodies. *International Review for the Sociology of Sport,* 55(6), 703-725.

Weiner, H. (1985). The physiology of eating disorders. *International Journal of Eating Disorders,* 4(4), 347-388.

Welever, N. (2014). Inside the occupational health setting. NATA News. Retrieved from: https://www.nata.org/sites/default/files/professional-interests-occupational-boeing-nata-news.pdf

Whitney, E.N., Hamilton E.M.N., Rolfes, S.R. (1990). *Understanding Nutrition, 5th Edition*. St. Paul, MN: West Publishing Company

Willett, K. et al. (2006). Comparison of bioelectrical impedance and BMI in predicting obesity-related medical conditions. *Obes. (Silver Spring*), 14(3), 480–490.

Winkelmann, Z. K., and Games, K. E. (2020). Athletic Trainers' Job Tasks and Status During the Coronavirus Disease 2019 Pandemic: A Preliminary Analysis. *Journal of Athletic Training*, 10.4085/1062-6050-0275.20. https://doi.org/10.4085/1062-6050-0275.20

Wood, D., Crapnell, T., Lau, L., et al. (2018). Emerging adulthood as a critical stage in the life course. In: Halfon, N., Forrest, C,B., Lerner, R.N., and Faustman, E.M. (Eds.), *Handbook of Life Course Health Development* (pp. 123-143). Cham. Switzerland: Springer.

Woodward, E., Haszard, J. J., Worsfold, A., Venn B. (2020). Comparison of self-reported speed of eating with an objective measure of eating rate. *Nutrients*, 12, 1-9.

Wohlfahrt-Veje, C. et al. (2014). Body fat throughout childhood in 2647 healthy Danish children: agreement of BMI, waist circumference, skinfolds with dual X-ray absorptiometry. *European Journal of Clinical Nutrition*, 68(6), 664–70.

The World Health Organization (WHO). (1914). Constitution. Geneva, Switzerland: WHO Press.

The World Health Organization (WHO). (2002). Global Physical Activity Questionnaire. Geneva, Switzerland: WHO Press.

Yedidia, M.J., Chou, J., Brownlee, S., Flynn, L., and Tanner, C.A. (2014). Association of faculty perceptions of work-life with emotional exhaustion and intent to leave academic nursing: report on a national survey of nurse faculty. *Journal of Nursing Education*, 53(10), 569– 579.

Zhang, J., Xu, L., Li, J., Sun, L., Qin, W., Ding, G., Wang, Q., Zhu, J., Yu, Z., Xie, S., and Zhou, C. (2019). Gender differences in the association between body mass index and health-related quality of life among adults: A cross-sectional study in Shandong, China. *BMC Public Health*. 19, 1021. https://doi.org/10.1186/s12889-019-7351-7

Zhu, B., Haruyama, Y., Muto, T., & Yamazaki, T. (2015). Association between eating speed and metabolic syndrome in a three-year population-based cohort study. *Journal of epidemiology*, 25(4), 332–336. https://doi.org/10.2188/jea.JE20140131

Zhu, X., Haegele, J. A., Davis, S. (2018). Physical educators' habitual physical activity and self-efficacy for regular exercise. *The Physical Educator,* 75, 50-63.

APPENDICES

APPENDIX A: IRB Approval

Oklahoma State University Institutional Review Board

Date:	06/12/2020
Application Number:	IRB-20-288
Proposal Title:	Health Behaviors in Athletic Trainers and Sports Medicine Specialized Physicians
Principal Investigator:	Emily Madrak
Co-Investigator(s):	Emily Madrak, Jennifer Volberding
Faculty Adviser:	Jennifer Volberding
Project Coordinator:	Emily Madrak, Jennifer Volberding
Research Assistant(s):	
Processed as:	Exempt
Exempt Category:	

Status Recommended by Reviewer(s): Approved

The IRB application referenced above has been approved. It is the judgment of the reviewers that the rights and welfare of individuals who may be asked to participate in this study will be respected, and that the research will be conducted in a manner consistent with the IRB requirements as outlined in 45CFR46.

This study meets criteria in the Revised Common Rule, as well as, one or more of the circumstances for which continuing review is not required. As Principal Investigator of this research, you will be required to submit a status report to the IRB triennially.

The final versions of any recruitment, consent and assent documents bearing the IRB approval stamp are available for download from IRBManager. These are the versions that must be used during the study.

As Principal Investigator, it is your responsibility to do the following:

1. Conduct this study exactly as it has been approved. Any modifications to the research protocol must be approved by the IRB. Protocol modifications requiring approval may include changes to the title, PI, adviser, other research personnel, funding status or sponsor, subject population composition or size, recruitment, inclusion/exclusion criteria, research site, research procedures and consent/assent process or forms.
2. Submit a request for continuation if the study extends beyond the approval period. This continuation must receive IRB review and approval before the research can continue.
3. Report any unanticipated and/or adverse events to the IRB Office promptly.
4. Notify the IRB office when your research project is complete or when you are no longer affiliated with Oklahoma State University.

Please note that approved protocols are subject to monitoring by the IRB and that the IRB office has the authority to inspect research records associated with this protocol at any time. If you have questions about the IRB procedures or need any assistance from the Board, please contact the IRB Office at 405-744-3377 or irb@okstate.edu.

Sincerely,
Oklahoma State University IRB

APPENDIX B: Pilot Study Survey

DH How many meals do you usually consume daily? A meal is defined as -any of the regular occasions in a day when a reasonably large amount of food is eaten, e.g. morning, noon, evening.

- 1 meal
- 2 meals
- 3 meals
- 4 meals
- 5 meals or more

Q3 Do you consume meals at regular times? Please give one answer.

- No
- Yes, but only some of them
- Yes, all of them

Q4 How would you describe your eating pace compared to others?

- Fast, I usually finish first
- Neither fast nor slow
- Slow, I usually finish last

Q5 On average, how many times per week do you eat breakfast?

▼ 0 (1) ... 7 (8)

Q6 How often do you snack between the meals?
A snack is defined as a small portion of food not considered a meal e.g. granola bar, piece of fruit, cup of baby carrots, cookies, cup of popcorn.

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q8 What type of milk and dairy beverages do you usually consume?
You can select more than one answer.

- Full fat
- Low fat
- No fat
- I do not consume dairy beverages

Q9 How do you usually have your meat prepared?

You can select more than one answer.

- Boiled
- Stewed
- Grilled
- Roasted
- Fried
- I don't eat meat

Q10 What type of bread spread do you use most often?
You can select more than one answer.

- I don't use any spreads
- Mayonnaise
- Margarine
- Butter
- Spreadable butter (butter and margarine mix)
- Lard
- Jam/Jelly
- Nut butter (peanut, almond, cashew, sunflower, etc.)
- Marshmallow Fluff

Q11 What type of fat do you usually use for sautéing, pan-frying, pan-searing, etc.?
You can select more than one answer.

- I don't use any fats for sautéing, pan-frying, pan-searing
- Liquid room temperature vegetable oils (including olive oil, canola, avocado, grape seed, etc.)
- Coconut Oil
- Margarine
- Butter
- Lard
- Other

Q12 Do you add any sugar to your hot beverages, e.g. tea, hot chocolate, coffee?
If your preferences vary depending on the type of the drink, please give an answer related to the drink you drink most often.

- No
- Yes, I add one teaspoon of sugar (or honey)
- Yes I add two or more teaspoons of sugar (or honey)
- Yes, I use non-sugar sweeteners (low-caloric substitute for sugar)

Q13 Do you add salt to your meals and sandwiches while cooking or once prepared?

- No
- Yes, but only sometimes
- Yes, I add salt to most of my meals

Q14 What type of water do you usually drink
You can select more than one answer.

- I don’t drink water
- Tap water
- Sparkling water (seltzer or club soda)
- Flavored water
- Bottled/spring water

Q17 We would like to learn how often you consume certain types of foods. While answering to the questions, please consider foods eaten over the last month during your meal times, between the meals, as well as those eaten at home and when you are out. Please give only one answer to each question.

Q18 How often do you eat white bread and bread products? E.g. white bread, rye bread, rolls, flour tortilla, bagel, muffin?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q19 How often to you eat whole wheat (brown) bread/bread rolls, or tortillas?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q20 How often do you have white rice, white pasta, breakfast cereal, couscous?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q21 How often do you eat oats, wholegrain pasta, brown or wild rice, or buckwheat products?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q22 How often do you eat fast food type products, e.g. French fries, hamburgers, pizza, hot-dogs, chicken nuggets, whether cooked at home or purchased from a fast-food restaurant?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q23 How often do you eat deep-fried foods (e.g. meat, fried potatoes, or flour-based foods such as hushpuppies, donuts)

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q24 How often do you use butter, vegetable oils, margarines, or mixes of butter and margarines as a bread spread, or as an addition to your meals/ for frying/ for baking etc.?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q33 How often do you use mayonnaise based products for bread spread, salad dressing (e.g. ranch dressing), dip, etc?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q25 How often do you drink or eat non-fat or low-fat dairy beverages or products (including flavored milk, hot chocolate, latte, yogurts, low-fat cheeses (such as cottage cheese))?
This does not include "nut milk" products (e.g. almond, soy, cashew, oat, hemp).

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q26 How often do you eat high-fat dairy products such as high-fat cheese (including processed cheese, blue cheese, cheese curds), or ice cream?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q99
How often do you eat “healthy” fats, such as avocado, nuts, seeds?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q27 How often do you eat cold luncheon meats, smoked sausages, hot-dogs?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q28 How often do you eat red meat, e.g. pork, beef, veal, mutton, lamb, game?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q29 How often do you eat white meat, e.g. chicken, turkey?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q30 How often do you eat seafood, fish (fresh or salt water), shrimp, crab, mollusks, lobster, etc?

- Never
- 1-3 times a month
- Once a week

- Few times a week
- Once a day
- Few times a day

Q31 How often do you eat eggs?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q32 How often do you eat plant-based protein foods, e.g. from beans, peas, soybeans, lentils?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q34 How often do you eat starchy vegetables e.g. butternut squash, parsnips, acorn squash, peas, yams, sweet potatoes, plantains, white potatoes (excluding fries and chips)?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q35 How often do you eat fruit?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q36 How often do you eat vegetables, excluding starchy vegetables such as butternut squash, potato (of any variety)? E.g. leafy greens, carrots, broccoli, green beans, summer squash etc.

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q37 How often do you eat sweets, e.g. cookies, cakes, chocolate bars, cereal bars, other?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q38 How often do you eat pre-packaged, instant, and or processed foods, e. g. pre-packed pasta meals, canned soup, freezer meals, pasta sauce?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q39 How often do you drink 100% fruit juices?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q40 How often do you drink 100% vegetable juices?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q41 How often do you drink sweetened (sugar, natural sweetener, or sugar-substitute) hot beverages, such as black tea, coffee (regular, latte, cappuccino, americano, etc), herbal or fruit teas?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q42 How often do you drink unsweetened hot beverages, such as black tea, coffee, herbal or fruit teas?

- Never

- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q43 How often do you drink sweetened carbonated beverages such as Coca-Cola, Pepsi, Sprite, Fanta, or sweetened uncarbonated beverages lemonade, capri sun, cranberry juice cocktail, sports drinks?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q44 How often do you drink energy drinks (excluding coffee and tea) such as Red Bull, Monster, Rockstar or other?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q45 How often do you drink water, e.g. mineral, tap water, bottled/spring?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q48 How often do you have alcoholic beverages?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q47 Are you currently following a diet?
A diet is defined as a special variety of food or way of eating, that is usually restricted, intended for weight loss or medical purposes.

- No
- Yes, as advised by my doctor for weight loss

- Yes, as advised by my doctor for medical reasons (disease, multiple allergies, intolerances)
- Yes, it was my personal decision

Q49 Have you ever followed a diet?

- No
- Yes, as advised by my doctor for medical reasons
- Yes, it was my personal decision

Q50 Question to respondents who are following or recently followed a diet.
Please select the diets you most recently followed or are following.

- Ketogenic
- Atkins
- Jenny Craig
- Nutrisystem
- Paleo
- Whole 30
- Zone
- Weight Watchers
- Noom
- South Beach
- DASH diet
- Volumetrics
- MIND diet
- TLC Diet
- Grapefruit
- Cabbage
- Blueprint Cleanse
- Intermittent fasting
- Mediterranean
- Vegan
- Vegetarian
- Raw Food
- Blood Type
- Fast
- Juice Cleanse
- Elimination (gluten free, lactose free, soy free, etc.)
- Non-Specific Low-carbohydrate
- Non-Specific Low-calorie/restrictive
- Other

Q51 On average, how long do you follow a diet? Please specify the duration.

- Less than a month
- 1-3 months
- 4-6 months
- 7-9 months

- 9-12 months
- >12 months

Q52 Did you lose weight?
- yes
- no

Q53 How long were you able to keep the weight off?
- 1-3 months
- 4-6 months
- 7-9 months
- 9-12 months
- 1-1.5 years
- 1.5- 3 years
- >3 years

Q54 How often do you order take-out or delivery from a bar, restaurant, or café? (not fast food)
- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q55 How often do you eat at home?
- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q56 How often do you prepare your own food?
- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q57 How would you describe your health status in comparison to other people your age?
- Worse than others
- The same as others
- Better than others

Q58 How would you describe your knowledge about nutrition?

- Insufficient
- Sufficient
- Good
- Very good

Q59 How would you describe your pattern of eating?

- Very bad
- Bad
- Needs work, but not bad
- Good
- Very good

Q60 How would you describe your pattern of eating during the weekdays when compared to the weekend?

- No difference
- Differs slightly
- Very different

Q63 On how many of the past 7 days...

0 days (1) 1-2 days (2) 3-5 days (3) 6-7 days (4) Prefer not to respond (5)

- Have you been deliberately trying to limit the amount of food you eat to influence your weight or shape (whether or not you have succeeded)?
- Have you gone for long periods of time (e.g., 8 or more waking hours) without eating anything at all in order to influence your weight or shape?
- Has thinking about food, eating, or calories made it very difficult to concentrate on things you are interest in (such as working, following a conversation or reading)?
- Have you had a definite fear that you might gain weight?
- Have you had a strong desire to lose weight?
- Have you tried to control your weight or shape by making yourself sick (vomit) or taking laxatives?
- Have you exercised in a drive or compulsive way as a means of controlling your weight, shape or body fat, or to burn off calories?
- Have you had a sense of having lost control over you eating (at the time that you were eating)?
- How many of these days (i.e. days on which you had a sense of having lost control over you eating) did you eat what other people would regard as an unusually large amount of food in one go?

Q64 Over the Past 7 days..

Not at all (1) slightly (2) moderately (3) significantly (4) prefer not to respond (5)

- Has your weight or shape influenced how you think about (judge) yourself as a person?
- How dissatisfied have you been with your weight?

Q66 We have a few questions left!

The following asks you to select a number for the amount of times per week you participate in variations of physical activity. A question will follow asking how many minutes, on average, you spend doing that activity outside of work. Do not factor stretching or flexibility into time spent doing physical activity.

Q67 On average, how many times per week do you participate in Vigorous physical activity (heart beats rapidly), e.g. running, jogging, strenuous fitness classes, lap swimming, heavy strength training)?
▼ 0 (1) ... 21 or more (22)

Q68 On average, how many minutes do you spend doing vigorous physical activity in one session?
▼ 0 (1) ... 180 or more (181)

Q69 On average, how many times per week do you participate in moderate physical activity (not exhausting), e.g. brisk walking, doubles tennis, easy bicycling, easy swimming, alpine skiing, light strength training.
▼ 0 (1) ... 21 or more (22)

Q70 On average, how many minutes do you spend doing moderate physical activity in one session?
▼ 0 (1) ... 180 or more (181)

Q71 On average, how many times per week do you participate in mild/light physical activity (minimal effort), e.g. yoga, archery, fishing from river bank, bowling, golf, leisurely walking?
▼ 0 (1) ... 21 or more (22)

Q72 On average, how many minutes do you spend doing mild/light activity in one session?
▼ 0 (1) ... 180 or more (181)

Q84 The next 3 questions ask about your work ability.

After this, there are few demographics questions and then you will be finished.

Q75 Which of the following best describes your physical work demands?
- mainly sedentary work
- mainly standing or walking work that is not strenuous,
- standing or walking work with lifting/carrying tasks,
- heavy and fast strenuous work.

Q76 How do you rate your current work ability with respect to physical demands of your work?
- Excellent
- Very good
- Good

- Fair
- Poor

Q77 How do you rate your current work ability with respect to the mental demands of your work?
- Excellent
- Very good
- Good
- Fair
- Poor

Q85 Please input your demographic information.

Q78 Gender
- Cisgender male
- Cisgender female
- Transgender female
- Transgender male
- Other
- Prefer not to answer

Q79 Age
▼ 22 or less (1) ... 80 or greater (59)
Q80 Height in Feet (For example, if You are 5' 6", select 5 here and 6 for the next question)
▼ 3 (1) ... 8 (6)

Q94 Height in Inches (For example, if You are 5' 6", you should have selected 5 above and 6 here)
▼ 0 (1) ... 11 (12)

Q81 Weight (in pounds)

This will be used to calculate BMI.
▼ 80 or less (1) ... 400 or more (321)

Q82 What setting do you work in? (Athletic Trainer)
- College/University
- Secondary School
- Clinic/Hospital
- Professional Sports
- Emerging Settings (performing arts, public safety, military, occupational health)
- Other
-

Q83 How many years have you been board certified?
- Less than one year
- 1-5 years

- 6-10 years
- 11-15 years
- 16-20 years
- Greater than 20 years

Q95 What is your average annual income?
▼ $0-20k (1) ... Greater than $200k (20)

Q96 On average, during a normal work week (before Covid-19), how many hours do you work per week?
▼ 0 (1) ... 100 or more hours (101)

Q97 What region of the United States do you normally reside in?
- Northeast (MD, PA, DE, NY, NJ, RI, CT, MA, VT, NH, ME)
- Southeast (VA, WV, KY, TN, NC, SC, GA, FL, AL, MS, LA, AR)
- Midwest (OH, IN, IL, MO, IA, MN, WI, MI, SD, ND, KS)
- Southwest (OK, TX, NM, AZ)
- Rocky Mountains (CO, WY, MT, ID, UT, NV)
- West Coast (CA, OR, WA)
- Alaska
- Hawaii

APPENDIX C: Main Study Survey

Q4 How many meals do you usually consume daily?
A **meal** is defined as any of the regular occasions in a day when a reasonably large amount of food is eaten, e.g. morning, noon, evening.

- 1 meal
- 2 meals
- 3 meals
- 4 meals
- 5 meals or more

Q5 Do you consume meals at regular times? Please give one answer.

- No
- Yes, but only some of them
- Yes, all of them

Q6 How would you describe your eating pace compared to others?

- Fast, I usually finish first
- Neither fast nor slow
- Slow, I usually finish last

Q7 On average, how many times per week do you eat breakfast?
▼ 0 ... 7
Q8 How often do you snack between the meals?

A **snack** is defined as a small portion of food not considered a meal e.g. granola bar, piece of fruit, cup of baby carrots, cookies, cup of popcorn.

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q9 What type of milk and dairy beverages do you usually consume?

You can select more than one answer.

- Full fat
- Low fat
- No fat
- I do not consume dairy beverages

- Q10 How do you usually have your meat prepared?
  You can select more than one answer.
- Boiled
- Stewed
- Grilled
- Roasted
- Fried
- I don't eat meat

Q11 What type of bread spread do you use most often?
You can select more than one answer.

- I don't use any spreads
- Mayonnaise
- Margarine
- Butter
- Spreadable butter (butter and margarine mix)
- Lard
- Jam/Jelly
- Nut butter (peanut, almond, cashew, sunflower, etc.)
- Marshmallow Fluff

Q12 What type of fat do you usually use for sautéing, pan-frying, pan-searing, etc.?
You can select more than one answer.

- I don't use any fats for sautéing, pan-frying, pan-searing
- Liquid room temperature vegetable oils (including olive oil, canola, avocado, grape seed,etc.)
- Coconut Oil
- Margarine
- Butter
- Lard
- Other

Q13 Do you add any sugar to your hot beverages, e.g. tea, hot chocolate, coffee?
If your preferences vary depending on the type of the drink, please give an answer related to the drink you drink most often.

- No
- Yes, I add one teaspoon of sugar (or honey)
- Yes I add two or more teaspoons of sugar (or honey)
- Yes, I use non-sugar sweeteners (low-caloric substitute for sugar)

Q14 Do you add salt to your meals and sandwiches while cooking or once prepared?

- No
- Yes, but only sometimes
- Yes, I add salt to most of my meals

Q15 What type of water do you usually drink?
You can select more than one answer.

- I don’t drink water
- Tap water
- Sparkling water (seltzer or club soda)
- Flavored water
- Bottled/spring water

Q16 We would like to learn how often you consume certain types of foods. While answering to thequestions, please consider foods eaten over the last month during your meal times, between the meals, as well as those eaten at home and when you are out. Please give only one answer to each question.

Q17 How often do you eat white bread and bread products? E.g. white bread, rye bread, rolls, flour tortilla, bagel, muffin?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q18 How often to you eat whole wheat (brown) bread/bread rolls, or tortillas?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q19 How often do you have white rice, white pasta, breakfast cereal, couscous?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q20 How often do you eat oats, wholegrain pasta, brown or wild rice, or buckwheat products?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q21 How often do you eat fast food type products, e.g. French fries, hamburgers, pizza, hot-dogs, chicken nuggets, whether cooked at home or purchased from a fast-food restaurant?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q22 How often do you eat deep-fried foods (e.g. meat, fried potatoes, or flour-based foods such as hushpuppies, donuts)

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q23 How often do you use butter, vegetable oils, margarines, or mixes of butter and margarines as a bread spread, or as an addition to your meals/ for frying/ for baking etc.?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day
-

Q24 How often do you use mayonnaise based products for bread spread, salad dressing (e.g. ranch dressing), dip, etc?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q25 How often do you drink or eat non-fat or low-fat dairy beverages or products (including flavored milk, hot chocolate, latte, yogurts, low-fat cheeses (such as cottage cheese))?
This does not include "nut milk" products (e.g. almond, soy, cashew, oat, hemp).

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q26 How often do you eat high-fat dairy products such as high-fat cheese (including processed cheese, blue cheese, cheese curds), or ice cream?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q27 How often do you eat “healthy” fats, such as avocado, nuts, seeds?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q28 How often do you eat cold luncheon meats, smoked sausages, hot-dogs?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q29 How often do you eat red meat, e.g. pork, beef, veal, mutton, lamb, game?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q30 How often do you eat white meat, e.g. chicken, turkey?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q31 How often do you eat seafood, fish (fresh or salt water), shrimp, crab, mollusks, lobster, etc?

- Never

- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q32 How often do you eat eggs?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q33 How often do you eat plant-based protein foods, e.g. from beans, peas, soybeans, lentils?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q34 How often do you eat starchy vegetables e.g. butternut squash, parsnips, acorn squash, peas, yams, sweet potatoes, plantains, white potatoes (excluding fries and chips)?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q35 How often do you eat fruit?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q36 How often do you eat vegetables, excluding starchy vegetables such as butternut squash, potato (of any variety)? E.g. leafy greens, carrots, broccoli, green beans, summer squash etc.

- Never
- 1-3 times a month

- Once a week
- Few times a week
- Once a day
- Few times a day

Q37 How often do you eat sweets, e.g. cookies, cakes, chocolate bars, cereal bars, other?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q38 How often do you eat pre-packaged, instant, and or processed foods, e. g. pre-packed pasta meals, canned soup, freezer meals, pasta sauce?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q39 How often do you drink 100% fruit juices?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q40 How often do you drink 100% vegetable juices?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q41 How often do you drink sweetened (sugar, natural sweetener, or sugar-substitute) hot beverages, such as black tea, coffee (regular, latte, cappuccino, americano, etc), herbal or fruit teas?

- Never
- 1-3 times a month

- Once a week
- Few times a week
- Once a day
- Few times a day

Q42 How often do you drink unsweetened hot beverages, such as black tea, coffee, herbal or fruit teas?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q43 How often do you drink sweetened carbonated beverages such as Coca-Cola, Pepsi, Sprite, Fanta, or sweetened uncarbonated beverages lemonade, capri sun, cranberry juice cocktail, sports drinks?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q44 How often do you drink energy drinks (excluding coffee and tea) such as Red Bull, Monster, Rockstar or other?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q45 How often do you drink water, e.g. mineral, tap water, bottled/spring?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q46 How often do you have alcoholic beverages?

- Never

- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day
-

Q47 Are you currently following a diet? A **diet** is defined as a special variety of food or way of eating, that is usually restricted, intended for weight loss, medical purposes, or belief systm.

- No
- Yes, as advised by my doctor for weight loss
- Yes, as advised by my doctor for medical reasons (disease, multiple allergies, intolerances)
- Yes, it was my personal decision
- Yes, it is based on a belief system (religion, spirituality) rather than for weight-loss (such as veganism)

Q48 Have you ever followed a diet intended for weight loss?

- No
- Yes, as advised by my doctor for medical reasons
- Yes, it was my personal decision
- No, it is based on a belief system rather than for weight-loss
-

Q49 Question to respondents who are following or recently followed a diet.Please select the diets you most recently followed or are following.

- Ketogenic
- Atkins
- Jenny Craig
- Nutrisystem
- Paleo
- Whole 30
- Zone
- Weight Watchers
- Noom
- South Beach
- DASH diet
- Grapefruit
- Cabbage
- Blueprint Cleanse
- Intermittent fasting
- Mediterranean
- Vegan
- Vegetarian
- Raw Food
- Blood Type
- Fast
- Juice Cleanse

- Elimination (gluten free, lactose free, soy free, etc.)
- Non-Specific Low-carbohydrate
- Non-Specific Low-calorie/restrictive
- Other

Q50 On average, how long do you follow a diet? Please specify the duration.

- Less than a month
- 1-3 months
- 4-6 months
- 7-9 months
- 9-12 months
- >12 months

Q51 Did you lose weight?

- yes
- no

Q52 How long were you able to keep the weight off?

- 1-3 months
- 4-6 months
- 7-9 months
- 9-12 months
- 1-1.5 years
- 1.5- 3 years
- >3 years

Q53 How often do you order take-out or delivery from a bar, restaurant, or café? (not fast food)

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q54 How often do you eat at home?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q55 How often do you prepare your own food?

- Never
- 1-3 times a month
- Once a week
- Few times a week
- Once a day
- Few times a day

Q56 How would you describe your health status in comparison to other people your age?

- Worse than others
- The same as others
- Better than others

Q57 How would you describe your knowledge about nutrition?

- Insufficient
- Sufficient
- Good
- Very good

Q58 How would you describe your pattern of eating?

- Very bad
- Bad
- Needs work, but not bad
- Good
- Very good

Q59 How would you describe your pattern of eating during the weekdays when compared to the weekend?

- No difference
- Differs slightly
- Very different

Q60 On how many of the past 7 days...

0 days (1) *1-2 days (2)* *3-5 days (3)* *6-7 days (4)* *Prefer not to respond (5)*

- Have you been deliberately trying to limit the amount of food you eat to influence your weight or shape (whether or not you have succeeded)?
- Have you gone for long periods of time (e.g., 8 or more waking hours) without eating anything at all in order to influence your weight or shape?
- Has thinking about food, eating, or calories made it very difficult to concentrate on things you are interest in (such as working, following a conversation or reading)?
- Has thinking about your weight or shape made it very difficult to concentrate on things you are interested in (such as working, following a conversation or reading)?
- Have you had a definite fear that you might gain weight?

- Have you had a strong desire to lose weight?
- Have you tried to control your weight or shape by making yourself sick (vomit) or taking laxatives?
- Have you exercised in a drive or compulsive way as a means of controlling your weight, shape or body fat, or to burn off calories?
- Have you had a sense of having lost control over you eating (at the time that you were eating)?
- How many of these days (i.e. days on which you had a sense of having lost control over you eating) did you eat what other people would regard as an unusually large amount of food in one go?

Q61 Over the Past 7 days..

Not at all (1) slightly (2) moderately (3) significantly (4) prefer not to respond (5)

- Has your weight or shape influenced how you think about (judge) yourself as a person?
- How dissatisfied have you been with your weight?

Q62 We have a few questions left!
The following asks you to select a number for the amount of times per week you participate in variations of physical activity. A question will follow asking how many minutes, on average, you spend doing that **activity outside of work**. Do not factor stretching or flexibility into time spent doing physical activity.

Q63 On average, how many times per week do you participate in Vigorous physical activity (heart beats rapidly), e.g. running, jogging, strenuous fitness classes, lap swimming, heavy strength training)?
▼ 0 ... 21 or more

Q64 On average, how many minutes do you spend doing vigorous physical activity in one session?
▼ 0 ... 180 or more

Q65 On average, how many times per week do you participate in moderate physical activity (not exhausting), e.g. brisk walking, doubles tennis, easy bicycling, easy swimming, alpine skiing, light strength training.
▼ 0 ... 21 or more

Q66 On average, how many minutes do you spend doing moderate physical activity in one session?
▼ 0 ... 180 or more

Q67 On average, how many times per week do you participate in mild/light physical activity (minimal effort), e.g. yoga, archery, fishing from river bank, bowling, golf, leisurely walking?
▼ 0 ... 21 or more

Q68 On average, how many minutes do you spend doing mild/light activity in one session?
▼ 0 ... 180 or more

Q69 The next 3 questions ask about your work ability.

After this, there are few demographics questions and then you will be finished.
Q70 Which of the following best describes your physical work demands?

- mainly sedentary work
- mainly standing or walking work that is not strenuous,
- standing or walking work with lifting/carrying tasks,
- heavy and fast strenuous work.

Q71 How do you rate your current work ability with respect to physical demands of your work?

- Excellent
- Very good
- Good
- Fair
- Poor

Q72 How do you rate your current work ability with respect to the mental demands of your work?

- Excellent
- Very good
- Good
- Fair
- Poor

Q73 Please input your demographic information.
Q74 Gender

- Cisgender male
- Cisgender female
- Transgender female
- Transgender male
- Other
- Prefer not to answer

Q75 Age
▼ 22 or less ... 80 or greater

Q76 Height in Feet (For example, if You are 5' 6", select 5 here and 6 for the next question)
▼ 3 ... 8

Q77 Height in Inches (For example, if You are 5' 6", you should have selected 5 above and 6 here)
▼ 0 ... 11

Q78 Weight (in pounds)

This will be used to calculate BMI.
▼ 80 or less ... 400 or more

Q79 What setting do you work in? (Athletic Trainer)

- College/University
- Secondary School
- Clinic/Hospital
- Professional Sports
- Emerging Settings (performing arts, public safety, military, occupational health)
- Other

Q80 How many years have you been board certified?

- Less than one year
- 1-5 years
- 6-10 years
- 11-15 years
- 16-20 years
- Greater than 20 years

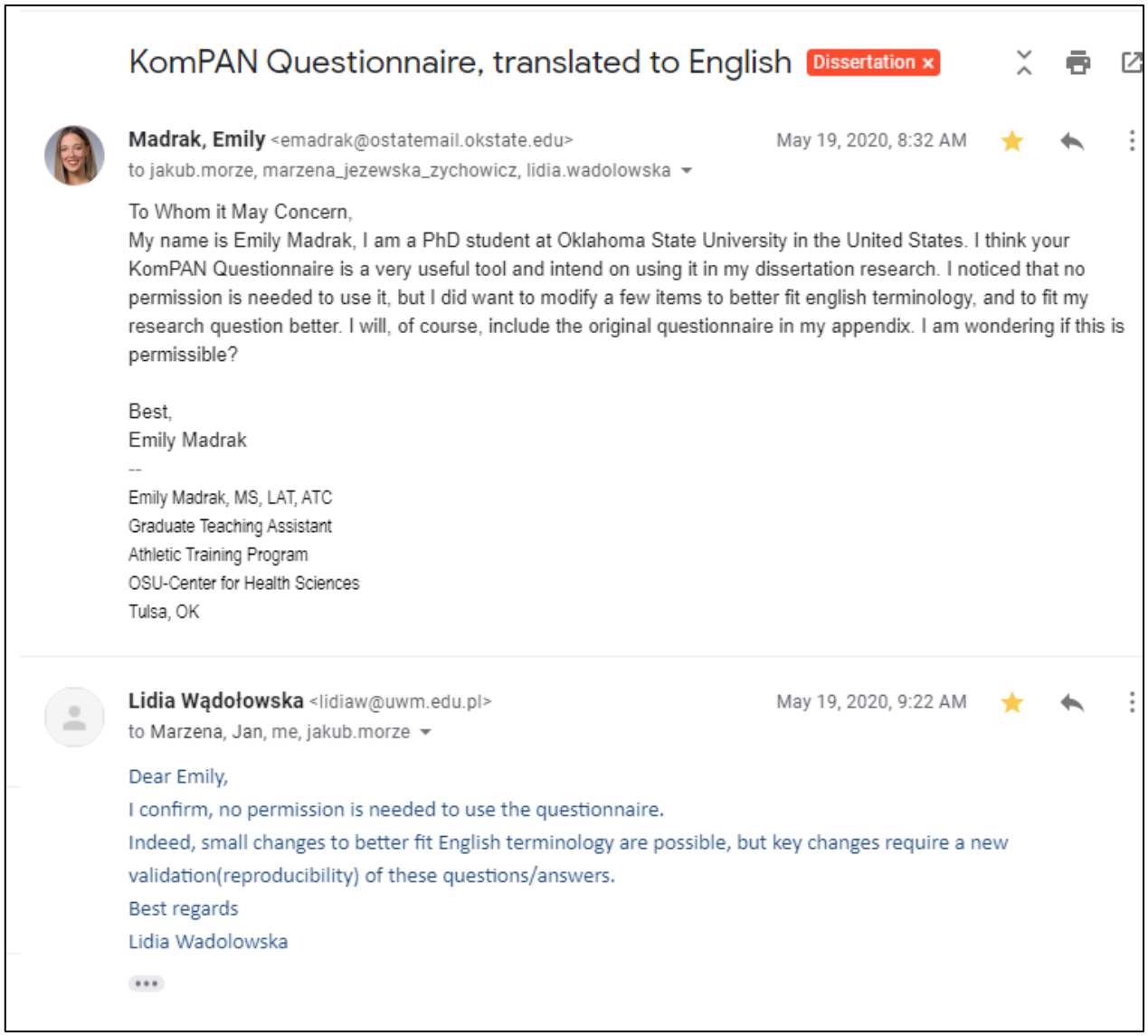
Q81 What is your average annual income?
▼ $0-20k ... Greater than $200k

Q82 On average, during a normal work week, how many hours do you work per week?
▼ 0 ... 100 or more hours

Q83 What region of the United States do you normally reside in?

- Northeast (MD, PA, DE, NY, NJ, RI, CT, MA, VT, NH, ME)
- Southeast (VA, WV, KY, TN, NC, SC, GA, FL, AL, MS, LA, AR)
- Midwest (OH, IN, IL, MO, IA, MN, WI, MI, SD, ND, KS)
- Southwest (OK, TX, NM, AZ)
- Rocky Mountains (CO, WY, MT, ID, UT, NV)
- West Coast (CA, OR, WA)
- Alaska
- Hawaii

APPENDIX D: Consent of Modification Letter, KomPAN



KomPAN Questionnaire, translated to English Dissertation ×

Madrak, Emily <emadrak@ostatemail.okstate.edu> May 19, 2020, 8:32 AM

to jakub.morze, marzena_jezewska_zychowicz, lidia.wadolowska

To Whom it May Concern,
My name is Emily Madrak, I am a PhD student at Oklahoma State University in the United States. I think your KomPAN Questionnaire is a very useful tool and intend on using it in my dissertation research. I noticed that no permission is needed to use it, but I did want to modify a few items to better fit english terminology, and to fit my research question better. I will, of course, include the original questionnaire in my appendix. I am wondering if this is permissible?

Best,
Emily Madrak
--
Emily Madrak, MS, LAT, ATC
Graduate Teaching Assistant
Athletic Training Program
OSU-Center for Health Sciences
Tulsa, OK

Lidia Wądołowska <lidiaw@uwm.edu.pl> May 19, 2020, 9:22 AM

to Marzena, Jan, me, jakub.morze

Dear Emily,
I confirm, no permission is needed to use the questionnaire.
Indeed, small changes to better fit English terminology are possible, but key changes require a new validation(reproducibility) of these questions/answers.
Best regards
Lidia Wadolowska

APPENDIX E: Original KomPAN Survey

Dietary Habits and Nutrition Beliefs Questionnaire for people 15-65 years old

version 1.2. self-administered questionnaire

Information in boxes are for the respondent

Additional instructions for the respondent in italics

We are conducting research, and we would like to learn about people's dietary habits and nutrition beliefs. The data obtained will be anonymous and undisclosed and will be used only for the purpose of this research. Thank you for your time and reliable answers.

Please read the questions and mark one or more answers with the X, according to the instructions, as shown in the example:

10. What types of food do you usually consume between the meals during the weekdays? You can give more than one answer.
(10/1)_X_ Fruit
(10/2)__ Vegetables
(10/3)__ Unsweetened dairy beverages and desserts, e.g. yoghurts, curd/cream cheese, milk
(10/4)__ Sweetened dairy beverages and desserts, e.g. homogenised cheese, sweetened milk beverages, flavoured milk
(10/5)_X_ Sweet snacks, e.g. confectionary, biscuits, cakes, chocolate bars, cereal bars, wafers
(10/6)__ Savoury snacks, e.g. crackers, pretzels, crisps, potato chips
(10/7)__ Nuts, almonds, seeds
(10/8)_X_ Other, please list ..... sandwiches, fruit chips .....

1.Respondent code |__ | __ | __ | __ | 2. Interviewer code | __ | __ | 3. Centre code | __ | __ | Please do not enter Date of the research: 4. Day | __ | __ | 5. Month | __ | __ | 6. Year |__ | __ | __ | __ | enter e.g. 01.12.2014

Part A. Dietary habits

We would like to ask you about your dietary habits over the last year.

7. How many meals do you usually consume daily?
Please give one answer.
Meal - any of the regular occasions in a day when a reasonably large amount of food is eaten, e.g. morning, noon, evening.
(1)__ 1 meal
(2)__ 2 meals
(3)__ 3 meals
(4)__ 4 meals
(5)__ 5 meals or more

8. Do you consume meals at regular times? Please give one answer.
(1)__ No
(2)__ Yes, but only some of them
(3)__ Yes, all of them

9. How often do you snack between the meals?
Please give one answer.
Snacking – usually a small portion of food eaten occasionally between the meals.
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

Question for people who snack between meals

10. What types of food do you usually consume between the meals during the weekdays? You can give more than one answer.
(10/1)__ Fruit
(10/2)__ Vegetables
(10/3)__ Unsweetened dairy beverages and desserts, e.g. yoghurts, curd/cream cheese, milk
(10/4)__ Sweetened dairy beverages and desserts, e.g. homogenised cheese, sweetened milk beverages, flavoured milk
(10/5)__ Sweet snacks, e.g. confectionary, biscuits, cakes, chocolate bars, cereal bars, wafers
(10/6)__ Savoury snacks, e.g. crackers, pretzels, crisps, potato chips
(10/7)__ Nuts, almonds, seeds
(10/8)__ Other, please list
.....
11. What type of milk and dairy beverages you usually consume? Please give one answer.
(1)__ Full fat
(2)__ Low fat
(3)__ No fat

12. How do you usually have your meat prepared? You can give more than one answer.
(1)__ Boiled
(2)__ Stewed
(3)__ Grilled
(4)__ Roasted
(5)__ Fried
(6)__ I don’t eat meat

13. What bread spread do you usually use? Please give one answer.
(1)__ I don’t use any spreads
(2)__ I use various spreads
(3)__ Mayonnaise
(4)__ Margarine
(5)__ Butter
(6)__ Spreadable butter (butter and margarine mix)
(7)__ Lard

14. What type of fat do you usually use for frying? Please give one answer.
(1)__ I don’t use any fats for frying
(2)__ I use various types of fats

(3)__ Vegetable oils (including olive oil)
(4)__ Margarine
(5)__ Butter
(6)__ Lard

15. Do you add any sugar to your hot beverages, e.g. tea, hot chocolate, coffee?
Please give one answer.
If your preferences vary depending on the type of the drink, please give answer related to the drink you drink most often
(1)__ No
(2)__ Yes, I add one teaspoon of sugar (or honey)
(3)__ Yes I add two or more teaspoons of sugar (or honey)
(4)__ Yes, I use sweeteners (low-caloric substitute for sugar)

16. Do you add salt to your meals and sandwiches once prepared? Please give one answer.
(1)__ No
(2)__ Yes, but only sometimes
(3)__ Yes, I add salt to most of my meals

17. What type of water do you usually drink? You can give more than one answer.
(1)__ I don't drink water
(2)__ Still water
(3)__ Sparkling water
(4)__ Flavoured water

Please think about a typical day in terms of your diet (last week) and answer the following questions.

18. What day of the week was it?
(1)__ Monday
(2)__ Tuesday
(3)__ Wednesday
(4)__ Thursday
(5)__ Friday
(6)__ Saturday
(7)__ Sunday

19. How many meals did you have that day? Please give a number ..... meals that day

Meal - any of the regular occasions in a day when a reasonably large amount of food is eaten, e.g. morning, noon, evening.

20. How many times did you have fruit or vegetables that day? Please give a number..... times that day. Please include fruit or vegetables consumed during meal times and when snacking.

21. Did you have any fast foods that day, e.g. potato chips, hamburgers, pizza, hot-dogs?
(1)__ No
(2)__ Yes. How many times? Please give a number..... times that day

Part B. Food frequency consumption

We would like to ask you about the foods you eat. We would like to learn, how often do you consume these types of foods.
While answering to the questions, please consider foods eaten over the last year during your meal times, between the meals as well as those eaten at home and when you are out.
In this part please give only one answer to each question.
22. How often do you eat white bread and bakery products, e.g. wheat bread, rye bread, wheat/rye bread, toast bread, bread rolls?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

23. How often to you eat wholemeal (brown) bread/bread rolls?
((1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

24. How often do you have white rice, white pasta, fine-ground groats, e.g. semolina, couscous?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

25. How often do you eat buckwheat, oats, wholegrain pasta or other coarse-ground groats?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

26. How often do you eat fast foods, e.g. potato chips, hamburgers, pizza, hot-dogs?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

27. How often do you eat fried foods (e.g. meat or flour-based foods such as dumplings, pancakes etc.)?
(1)__ Never
(2)__ 1-3 times a month

(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

28. How often do you use butter as a bread spread or as an addition to your meals/ for frying/ for baking etc.?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

29. How often do you use lard as a bread spread, or as an addition to you meals/ for frying/ for baking etc.?
((1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

30. How often do you use vegetable oils or margarines or mixes of butter and margarines as a bread spread, or as an addition to your meals/ for frying/ for baking etc.?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

31. How often do you drink milk (including flavoured milk, hot chocolate, latte)?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

32. How often do you eat fermented milk beverages, e.g. yoghurts, kefir (natural or flavoured)?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

33. How often do you eat fresh cheese curd products, e.g. cottage cheese, homogenised cheese, fromage frais?

(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

34. How often do you eat cheese (including processed cheese, blue cheese)?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

35. How often do you eat cold meats, smoked sausages, hot-dogs?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

36. How often do you eat red meat, e.g. pork, beef, veal, mutton, lamb, game?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

37. How often do you eat white meat, e.g. chicken, turkey, rabbit?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

38. How often do you eat fish?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

39. How often do you eat eggs?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week

(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

40. How often do you eat pulses-based foods, e.g. from beans, peas, soybeans, lentils?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

41. How often do you eat potatoes (excluding chips and crisps)?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

42. How often do you eat fruit?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

43. How often do you eat vegetables?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

44. How often do you eat sweets, e.g. confectionary, biscuits, cakes, chocolate bars, cereal bars, other?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

45. How often do you eat instant soups or ready-made soups, e.g. tinned, jar, concentrates (excluding frozen soup mixes)?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week

(5)__ Once a day
(6)__ Few times a day

46. How often do you eat tinned (jar) meats?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

47. How often do you eat tinned (jar) vegetables, e.g. pickles?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

48. How often do you drink fruit juices?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

49. How often do you drink vegetable juices or fruit and vegetable juices?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

50. How often do you drink sweetened hot beverages, such as black tea, coffee, herbal or fruit teas?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

51. How often do you drink sweetened carbonated or still beverages such as Coca-Cola, Pepsi, Sprite, Fanta, lemonade?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day

(6)__ Few times a day

52. How often do you drink energy drinks such as Red Bull, Monster, Rockstar or other?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

53. How often do you drink water, e.g. mineral, tap water?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

54. How often do you have alcoholic beverages?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

Part C. Nutrition beliefs

Below are statements regarding food and nutrition.
Please provide your view regarding each of the statements.
In this part please give one answer to each statement.
Statement

True False Unsure (1) (2) (3)

55. It is enough to eat wholegrains/cereals once a day.

56. Only children and adolescents should drink milk.

57. Fruit and/or vegetables should be consumed with every meal.
Statement

58. Consumption of mouldy bread can result in food poisoning caused by Salmonella.

59. High intakes of salt protect from hypertension.

60. Limiting high-fat foods in everyday diet is protective against cardiovascular diseases.

61. Frequent consumption of oily fish contributes to atherosclerosis.

62. Frequent consumption of grilled meats contributes to the onset of cancer.

63. Vegetarian diet increases the risk of anaemia.

64. Bio-yoghurts contain beneficial gut bacteria.

65. Vegetable oils and olive oil contain a high amount of cholesterol.

66. Wholemeal bread have more fibre than white bread.

67. Fruit and vegetables are a source of 'empty calories'.

68. Butter and fortified margarines have high content of vitamin A and D.

69. Cheese is a better source of calcium than cottage cheese.

70. Offal has high amounts of 'bad' cholesterol - LDL.

71. In a healthy diet, complex carbohydrates should be replaced with simple sugars.

72. In a balanced diet, proteins should be the main source of energy.

73. Inadequate intakes of vitamin PP can cause skin inflammation and diarrhoea.

74. Sun exposure increases the synthesis of vitamin D in the human body.

75. Phosphorus is a component of neural tissue.

76. The ratio of calcium to phosphorus in a healthy diet should be 1:1.

77. Consumption of fruit with high content of vitamin C increases bioavailability of iron.

78. Starting cooking vegetables in cold water helps to preserve the nutrients.

79. Sweets and animal fats are particularly high nutrient dense foods.

Part D. Lifestyle and personal data

80. Are you currently following a diet?
(1)__ No
(2)__ Yes, as advised by my doctor for medical reasons
(3)__ Yes, it was my personal decision

True False Unsure (1) (2) (3)

At the end, we would like to ask you questions referring to your lifestyle and collect some personal data. This will allow us to retain an element of individuality in our research.
If you feel that some of the questions are too personal, you can refuse to answer. We would be however grateful for every honest answer given.
In this part please give one answer to each question.
Question to respondents who are following a diet.

81. Please provide the type of a diet .....

Question to respondents who are following a diet.

82. How long have you been following this diet?
Please specify the duration
You can give number of weeks or number of months or number of years.
Please provide a number of: ..... weeks, ... months, ... years.

83. How often do you eat out, e.g. in a bar, restaurant, café, canteen?
(1)__ Never
(2)__ 1-3 times a month
(3)__ Once a week
(4)__ Few times a week
(5)__ Once a day
(6)__ Few times a day

Question for respondents who drink alcoholic beverages.
84. What type of alcohol do you usually drink?
(1)__ Beer (2)__ Wine (3)__ Drinks (4)__ Vodka

85. Do you currently smoke cigarettes, pipe or other tobacco?
(1)__ No (2)__ Yes

86. Have you smoked cigarettes, pipe or tobacco in the past?
(1)__ No (2)__ Yes

87. How many hours do you sleep a day during weekdays?
(1)__ 6 or less hours/day (2)__ 7 or 8 hours/day (3)__ 9 or more hours/day

88. How many hours do you sleep a day during the weekend?
(1)__ 6 or less hours/day (2)__ 7 or 8 hours/day (3)__ 9 or more hours/day

89. How many hours a day (on average) do you spend watching TV or using a computer (including work)?
(1)__ Less than 2 hours
(2)__ from 2 to almost 4 hours
(3)__ from 4 to almost 6 hours
(4)__ from 6 to almost 8 hours
(5)__ from 8 to almost 10 hours
(6)__ More than 10 hours

90. How would you describe your physical activity at work or at school?
(1)__ Low: more than 70% of time is sedentary
(2)__ Moderate: about 50% of time is sedentary and 50% active
(3)__ High: about 70% of time is active or physical labour of high intensity

91. How would you describe your physical activity during your time off?
(1)__ Low: mostly sedentary, watching TV, reading newspapers/books, light house works, walking for 1-2
hours/week

(2)__ Moderate: walking, cycling, exercise, gardening or other light physical activity for 2-3 hours/week
(3)__ High: cycling, running, gardening and other sport/recreational activities that require physical
activity for longer than 3 hours/week

92. How would you describe your health status in comparison to other people your age?
(1)__ Worse than others (2)__ The same as others (3)__ Better than others

93. How would you describe your knowledge about nutrition?
(1)__ Insufficient (2)__ Sufficient (3)__ Good
(4)__ Very good

94. How would you describe your diet?
(1)__ Very bad (2)__ Bad
(3)__ Good (4)__ Very good

95. How would you describe your diet during the weekdays when compared to the weekend?
(1)__ No difference really (2)__ Differs slightly (3)__ Very different

96. How much do you weigh (kg)? |__ | __ | __ |, __ | kg 97. What is your height (cm)? |__ | __ | __ |, __ | cm

98. What is your waistline (cm)? |__ | __ | __ |, __ | cm
If you don't know, please provide your clothing size (waist measurement). If feasible, waistline can be measured with measuring tape.

99. Gender:
(1)__ Male (2)__ Female

Date of birth: 100. Day |__ | __ | 101. Month |__ | __ | 102. Year |__ | __ | __ | __ | enter e.g. 01.12.1970

103. What is your place of residence?
(1)__ Village
(2)__ Town below 20.000 inhabitants
(3)__ Town between 20.000 and 100.000 inhabitants
(4)__ City over 100.000 inhabitants
104. How many people are there in your household (including you)? ..... people

105. How many children/adolescents are there in your household? .....people under 18 years old

106. How would you describe your financial situation?
(1)__ Below average
(2)__ Average
(3)__ Above average

107. How would you describe your household's overall situation?
(1)__ We live very modestly – we do not have enough money for basic needs
(2)__ We live modestly – we have to be very careful with our daily budget

(3)__ We live normally - we have enough money for our daily needs, but we need to budget for bigger purchases
(4)__ We live relatively wealthy – we have enough money for our needs without particular budgeting
(5)__ We live very wealthy – we can afford some luxury
Question for adult respondents.
108. Do you work?
(1)__ No, I am retired or receiving a disability living allowance
(2)__ No, I am on maternity leave, I am unemployed or other (housewife/househusband)
(3)__ Yes, but it is only a temporary job
(4)__ Yes, I am permanently employed
(5)__ No, I study
Question for adult respondents.

109. What is you education?
(1)__ Primary
(2)__ Lower secondary
(3)__ Upper secondary
(4)__ Higher (e.g. BSc, MSc)
Question for respondents under 18 years old.

110. What is mother's (or legal guardian) education?
(1)__ Primary
(2)__ Lower secondary
(3)__ Upper secondary
(4)__ Higher (e.g. BSc, MSc)
Question for respondents under 18 years old.

111. What is father's (or legal guardian) education?
(1)__ Primary
(2)__ Lower secondary
(3)__ Upper secondary
(4)__ Higher (e.g. BSc, MSc)

Thank you very much for your time

VITA

Emily Madrak

Candidate for the Degree of

Doctor of Philosophy

Dissertation: HEALTH BEHAVIORS IN ATHLETIC TRAINERS

Major Field: Health and Human Performance

Biographical:

Education:

Completed the requirements for the Doctor of Philosophy in Health and Human Performance at Oklahoma State University, Stillwater, OK in May 2021.

Completed the requirements for the Master of Science in Exercise Science at California University of Pennsylvania, California, PA in 2013.

Completed the requirements for the Bachelor of Science in Athletic Training at Lock Haven University, Lock Haven, PA in 2012.

Experience:

Oklahoma State University-Tulsa, OK Doctoral Teaching Assistant	June 2017-present Center for Health Sciences
Bucknell University-Varsity Athletics Assistant Athletic Trainer	August 2013-May 2017
Edinboro University-Varsity Athletics Graduate Assistant Athletic Trainer	July 2012-July 2013

Professional Memberships:

Oklahoma State Licensure	June 2017-present
BOC Certified Athletic Trainer	May 2012-present