Walden University

College of Health Sciences

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Jay Martin

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Review Committee
Dr. Raymond Thron, Committee Chairperson, Health Services Faculty
Dr. Ronald Hudak, Committee Member, Health Services Faculty
Dr. Daniel Okenu, University Reviewer, Health Services Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
2017

Abstract

The Effectiveness of Course-Based Health Education Interventions Towards Increased Physical Activity Among College Students

by

Jay M. Martin

M.S., Seattle Pacific University, 2001

B.S., Black Hills State University, 1996

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Health Services

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Abstract

Despite the many health benefits, physical activity participation among those between 18 to 24 years is in significant decline during the college-age years. Postsecondary education has been identified as an ideal environment where young adults should be targeted for physical activity participation. However, a limited number of studies have assessed the effectiveness of college-level health education and physical education program interventions to increase physical activity levels among college students. The purpose of this study was to examine current physical activity levels of college age students who have completed a college-level health education course and laboratory to gain a better understanding for developing and improving interventions targeted at increasing physical activity behaviors. The study employed a quantitative method using the Godin Leisure-Time Exercise Questionnaire, Exercise Motivation Inventory-2 and the Processes of Change Physical Activity Questionnaire 4.1, each designed specifically to assess leisure-time physical activity behaviors and identify patterns, habits, and how shifts in physical activity behavior occur. Study subjects included candidates who had completed a college-level health education lecture course and laboratory. Study findings showed no statistical significance regarding attitudes or behaviors about physical activity regardless of gender, class standing, or age. Although data analysis for this study provided no statistical significance, the findings are consistent with peer-reviewed literature, which suggests course-based physical activity programs only have been found to be minimally effective on long-term behavior change for increasing physical activity among college age students.

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Dedication

I dedicate this dissertation to James R. and Eleanor D. Martin, two of the best parents any child could have ever asked for. Also, I would like to dedicate this dissertation to Sifu Bruce Lee, "Your inspiration continues to guide us toward our personal liberation."

Acknowledgments

I would like to thank all of the teachers I have had in my journey to completing my lifelong goal of earning this degree. From Hazelwood Elementary School, McKnight Middle School, Renton High School, Black Hills State University, Seattle Pacific University and Walden University, thank you all for your guidance and inspiration you have given to myself and my classmates.

To my instructors in the United States Navy and the United States Marine Corps, Recruit Training Command, Naval Hospital Corps School, and Field Medical Service School. I want to thank you for instilling in me confidence that even the most challenging of situations can be overcome with determination, focus, and teamwork. Semper Fi, Oorah!

I would like to give special thanks to Dr. Rob Schurrer, to your mentorship, guidance, and friendship, I will be forever grateful. I would also like to thank Dr. Raymond Thron and Dr. Ronald Hudak, for their continued patience and guidance through this research project.

Finally, to all of the people I have been fortunate enough to meet along my journey through life both in and out of the education spectrum; it is with our experiences which continue to motivate me towards pursuing the goal of actualizing oneself and to fulfilling the ultimate human achievement of leaving the world a little better for having been here

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Chapter 1: Introduction to the Study

Background of the Study

Healthy People 2020 lists physical activity as a leading indicator for improving the health of all Americans and sets a goal of increasing daily physical activity levels to improve health, fitness, and quality of life (U.S. Department of Health and Human Services, 2015). Healthy People 2020 sets objectives for increased physical activity levels in both adults and adolescents to meet current federal physical activity guidelines for aerobic and muscle-strengthening activity (U.S. Department of Health and Human Services, 2015). Also, Healthy Campus 2020, adapted from Healthy People 2020, provides a structure and set of strategies for improving national health objectives and overall health status on college campuses nationwide while emphasizing the importance of postsecondary and college-based physical education and health education courses (American College Health Association, 2012). Furthermore, various studies indicate that participating in regular physical activity reduces the risk for depression, diabetes, heart disease, high blood pressure, obesity, stroke, and certain kinds of cancer (Community Preventive Services Task Force, 2013).

However, various national surveillance programs consistently indicate that most adults (ages 18-64) in the United States do not meet the current recommendations for physical activity prescribed by the 2008 Physical Activity Guidelines Advisory Committee (Community Preventive Services Task Force, 2013). In fact, more than 80% of adults do not meet recommended guidelines for both aerobic and muscle-strengthening physical activities (U.S. Department of Health and Human Services, 2015).

Healthy People 2020 addresses specific factors positively associated with increasing adult physical activity levels including behavioral and social approaches related to postsecondary education programs that include college-based physical education and health education programs (U.S. Department of Health and Human Services, 2013; Community Preventive Services Task Force, 2013). These programs aim to set long-term behavioral patterns during the transition to adulthood by using didactic and behavioral education efforts to increase physical activity levels among college students, including supervised physical activity in a lecture and/or laboratory oriented setting (Community Preventive Services Task Force, 2013; Kahn et al., 2002).

Specific topics addressed in lecture-based coursework included benefits and risks of participating in physical activity, amount and type of physical activity needed to improve and sustain a healthy lifestyle, and behavioral management techniques focused on long-term behavior change (Kahn et al., 2002).Students were also provided a laboratory or practical setting where they engaged in physical activity, developed personal goals and activity plans related to health and fitness, and wrote term papers based on their experiences (Kahn et al., 2002). However, even with extensive research existing on the advantages of an active lifestyle and higher education courses designed to provide education on the benefits of physical activity, physical inactivity remains a significant health problem among college-age students (Pauline, 2013).

Problem Statement

According to the Centers for Disease Control and Prevention (2011), engaging in regular physical activity helps improve overall health and fitness, while reducing the risk of developing many chronic diseases across the lifespan. However, research indicates

physical activity participation is in significant decline within the 18-24 age group (Caspersen, Pereire, & Curran, 2000). As a result, a decrease in physical activity levels among college-age adults is especially troubling as many adult health behaviors are established during the college years (Calfas et al., 2000; Pauline, 2013). Consequently, Healthy People 2020 has identified postsecondary education institutions as an ideal environment where young adults should be targeted for physical activity promotion (U.S. Department of Health and Human Services, 2015, Pauline, 2015).

However, there have only been a limited number of studies that have assessed the effectiveness of college-level health education and physical education program interventions to increase physical activity levels among college-age adults (Kahn et al., 2002). Therefore, further research is needed to identify ways to increase physical activity levels among the college-age population by gaining a clearer understanding of college students' physical activity patterns and fundamental physical activity determinants (Keating, Guan, Pinero & Bridges, 2005).

Purpose of the Study

The purpose of this quantitative study was to examine current physical activity levels of college age students who have completed a college-level health education lecture course and laboratory to gain a better understanding of developing and improving interventions targeted at incresing physical activity behaviors. Despite five decades of data providing convincing evidence that engaging in regular bouts of physical activity provides numerous health benefits of both physiological and psychological changes, a growing number of the global population are inactive. Therefore, declining levels of physical activity are now being recognized as a major global health problem, making it

one of the leading causes of mortality worldwide. Determining the magnitude of the association between physical activity levels and the college age student population is an important initial step in developing appropriate interventions.

Nature of the Study

This study utilized a quantitative method through a self-administered questionnaire designed specifically to assess the processes of behavior change related to physical activity while making progress toward meeting guidelines for a physically active lifestyle (Marcus, Rossi, Selby, Niaura, & Abrams, 1992; Marcus & Forsyth, 2009). The items on the self-administered questionnaire are rated on a 5-point Likert-type scale. A total of 264 undergraduate students were contacted via e-mail and asked to volunteer to participate in the study. The study attempted to better understand how college students' physical activity habits, physical activity determinants, and self-efficacy levels influence their physical activity levels. Moreover, the results may provide useful data to health educators, policy makers, and public health researchers by assisting in the development and augmentation of college level physical activity programs.

Research Questions and Hypotheses

This study seeks to test the following hypotheses and associated research questions:

RQ1: What are the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among male and female college students?

$H_0$1: There are no differences in physical activity habits, physical activity determinants, and self-efficacy levels among male and female college students.

H_a1: There are differences in physical activity habits, physical activity determinants, and self-efficacy levels among male and female college students.

RQ2: What are the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) of male and female college students?

$H_0 2$: There are no differences in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) of male and female college students.

$H_a 2$: There are differences in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) of male and female college students.

RQ3: What are the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among traditional college students vs. nontraditional college students?

$H_0 3$: There are no differences in physical activity habits, physical activity determinants, and self-efficacy levels among traditional college students vs. nontraditional college students.

$H_a 3$: There are differences in physical activity habits, physical activity determinants, and self-efficacy levels among traditional college students vs. nontraditional college students.

Theoretical Base

The theoretical framework for this study is Bandura's (1977) social-cognitive learning theory, which suggests humans are not born knowing the full range of human behavior, and as such critical life skills must be learned through response patterns being acquired via direct experience or by personal observation, with biological, genetic, and hormonal factors also affecting physical development that can later influence behavioral potentialities (Bandura, 1977). Furthermore, a person's own innate abilities, including self-efficacy, goal setting, anticipating the outcomes of a behavior, ability to learn through observation of others, replicating personal experiences, and adjusting behavior appropriately, all play important roles in long-term behavioral change (Boyle, Matten, Lassiter & Ritzler 2011; Baranowski, Perry & Parcel, 2002). Bandura (2004) provides a health behavior model for social cognitive theory where perceived self-efficacy can both influence and impede a person's ability to adopt a healthy behavior, which is summarized in Figure 1.

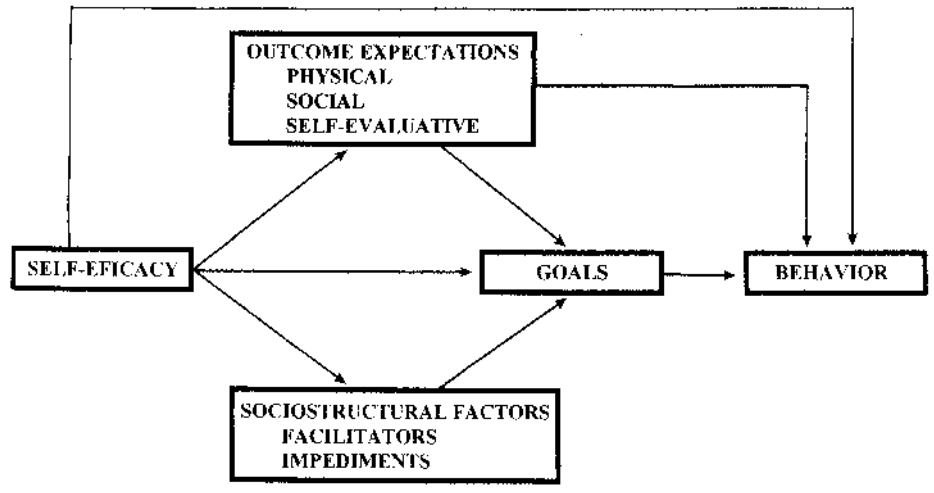

Figure 1. Social cognitive theory as it relates to adopting health-promoting behaviors.

Definition of Terms

Terms as they relate to the research are defined as follows:

Body composition: The proportion of fat and fat-free mass (muscle, bone, and water) in the body (Fahey, Insel, & Roth, 2015).

Body mass index (BMI): A measure of relative body weight correlating highly with more direct measures of body fat, calculated by dividing total body weight in kilograms by the square of body height in meters (Fahey, Insel, & Roth, 2015).

College: "An independent institution of higher learning offering a course of general studies leading to a bachelor's degree" (College, 2015).

Corequisite: "A formal course of study required to be taken simultaneously with another) (Corequisite, 2015).

Exercise: Planned, structured, repetitive movement intended to improve or maintain physical fitness (Fahey, Insel, & Roth, 2015).

Essential fat: Adipose tissue that makes up about 3-5% of total body weight in men and about 8-12% in women (Fahey, Insel, & Roth, 2015).

Fat mass: Body fat percentage incorporated into the nerves, brain, heart, lungs, liver, mammary glands, and other body organs and tissues on the human body (Fahey, Insel, & Roth, 2015).

Fat-free mass: The nonfat component of the human body, consisting of skeletal muscle, blood, and water (Fahey, Insel, & Roth, 2015).

Health-related fitness: Physical capacities that contribute to health: cardiorespiratory endurance, muscular strength, muscular endurance, flexibility, and body composition (Fahey, Insel, & Roth, 2015).

Lifestyle choices: Individuals' habits and customary behaviors, such as smoking, diet, exercise, and alcohol use (Fahey, Insel, & Roth, 2015).

Nontraditional students: Students aged greater than 25 years who live off of campus, are working professionals, and attend afternoon and/or evening classes (U.S. Department of Education, National Center for Education Statistics, 2016).

Obesity: Severely overweight, characterized by an excessive accumulation of body fat; may also be defined in terms of some measure of total body weight or a body mass index of 30 or more (Fahey, Insel, & Roth, 2015).

Overweight: Body weight above the recommended range for good health, sometimes defined as a body mass index between 25 and 29.9, a measure of the proportion of weight to height (Fahey, Insel, Roth, 2015).

Physical activity: Body movement that is carried out by the skeletal muscles and requires energy (Fahey, Insel, Roth, 2015).

Physical fitness: A set of physical attributes that allows the body to respond or adapt to the demands and stress of physical effort (Fahey, Insel, & Roth, 2015).

Physical training: The performance of different types of activities that cause the body to adapt and improve its level of fitness (Fahey, Insel, & Roth, 2015).

Traditional students: Average college student age 18-25 who lives on campus and attends day classes (U.S. Department of Education, National Center for Education Statistics, 2016).

Self-efficacy: The belief in one's ability to take action and perform a specific task (Bandura, 1998).

Assumptions

This study investigated what relationship exists between completing a college-level health education lecture course and accompanying laboratory with increases in physical activity levels among college students. The following were the assumptions considered:

1. Male college students are more physically active than female college students.
2. Physical activity behaviors are different among male and female college students based on their class standing.
3. Traditional students are more likely to engage in physical activity than nontraditional students.

Selection of Study Participants

Regardless of the well-recognized health benefits associated with physical activity, a high percentage of college students within the United States remain physically inactive, which may contribute to serious health problems (Woekel et al., 2013; Irwin, 2007). A recent study conducted by the American College Health Association found only 43% of the 34,208 college students surveyed met the adult physical activity recommendations by both the American College of Sports Medicine and American Heart Association (American College Health Association, 2009; Haskell et al., 2007; Woekel, et al., 2013). Furthermore, another study found that physical activity levels declined by as much as 62.5% during the transition from high school to college (Cullen et al., 1999; Woekel et al., 2013). Therefore, it remains imperative to find ways of improving campus-wide health and wellness interventions to increase levels of physical activity by which

these programs are presented along with the continued pursuit of improving the overall health of the college student population.

Scope and Delimitations

Of the health assessment data retained of 876 students who previously completed a college-level health education lecture course and laboratory, 264 were asked to volunteer to participate in this study. The study was limited in that all study volunteers were enrolled at either the main campus or branch campus of a comprehensive public institution located in the upper Midwestern United States.

Significance of the Study

Available studies provide insufficient evidence for assessing the effectiveness of college-based physical education and health education program interventions to increase physical activity and improve fitness levels (Kahn, et al., 2002; Brynteson & Adams, 1993; Epstein, Wing, Thompson, & Griffin, 1980; Lock, 1990; Calfas et al., 2000; Sallis et al., 1999; Slava, Laurie, & Corbin, 1984). Furthermore, physical activity interventions in higher education are in their early stages and have only shown moderate effects, which is partially due to the small number of studies and limitations in design and execution of the types of programs being offered (Boyle et al., 2011; Kahn et al., 2002). The results may provide useful data to health educators, policy makers, and public health researchers by assisting in the development and augmentation of college-level physical activity programs. Gaining a greater understanding of college students' attitudes and behaviors toward physical activity may provide a foundation for improving their physical activity participation (Keating et al., 2005; Pauline, 2013). Also, increasing levels of physical

activity participation may help improve the overall health of the college student population (Keating et al., 2005; Pauline, 2013).

Social Change Implications

The effects a sedentary lifestyle has in impacting the health of people of all ages has been well documented (U.S. Department of Health of Health and Human Services, 2002). According to World Health Organization (2009), declining levels of physical activity is being increasingly recognized as a major global health problem with estimates of up to 3.3 million people dying around the world each year due to complications of physical inactivity, making it the fourth leading underlying cause of mortality. Moreover, as promotion of physical activity and prevention of noncommunicable diseases becomes essential in public health policy in more and more countries, continued analyses of the benefits associated with physical activity and complications attributed to inactivity are becoming a critical component of real global public health (Pratt, Norris, Lobelo, Roux, & Wang, 2014).

According to the Centers for Disease Control and Prevention (2011), few lifestyle choices have as large an influence in improving a person's overall health as physical activity. People who are physically active for about seven hours a week have a 40 percent lower risk of dying prematurely than those who are active for less than 30 minutes a week (Centers for Disease Control and Prevention, 2011). Regular physical activity also improves health in the following ways:

- reduces the risk of dying prematurely from heart disease and other conditions;
- reduces the risk of developing diabetes;
- reduces the risk of developing high blood pressure;

- reduces blood pressure in people who already have high blood pressure;
- reduces the risk of developing colon and breast cancer;
- helps to maintain a healthy weight;
- helps build and maintain healthy bones, muscles, and joints;
- helps older adults to become stronger and better able to move about without falling;
- reduces feelings of depression and anxiety; and
- promotes psychological well-being. (Source: U.S. Department of Health of Health and Human Services, 2002).

Along with the well-known global health implications associated with physical activity, the decline of physical activity levels also directly impacts the world economy (Pratt et al., 2014). The economic burden associated with physical inactivity has been estimated to be from 1% to 2.6% of total health care costs depending on the country and health care system being used (Pratt et al., 2014). Furthermore, physical activity levels indirectly influence productivity losses due to premature death and disability and can drastically affect the availability of economic resources (Pratt et al., 2014).Therefore, it remains imperative to continue to find ways of increasing physical activity levels in the ongoing pursuit of improving global public health for all (Pratt et al., 2014).

Summary and Transition

Multiple studies have shown that the college student population is becoming less active and is not meeting the recommended guidelines for amounts of physical activity necessary to maintain a consistent level of good health (Crombie, Ilich, Dutton, Panton, & Abood, 2009; Pauline, 2013). The regression of physical activity during the college

years is even more alarming because many healthy behaviors are not being established, which can continue into adulthood (Calfas et al., 2000; Pauline, 2013). As a result, Healthy People 2020 objectives have identified postsecondary education institutions as a way to obviate an unhealthy lifestyle while promoting physical activity (U.S. Department of Health and Human Services, 2014; Pauline, 2013).

However, further research is necessary to better understand college students' physical activity behaviors and determinants to increasing activity levels while continuing to improve the overall health among this demographic group (Keating et al., 2005). Chapter 2 provides a comprehensive review of the current research related to physical activity levels among college students and the efficacy of health and fitness course-based peer education intervention to increase physical activity levels. Also, behavioral theories are explored to better understand the motives and determinants related to activity levels among college students.

Chapter 2: Literature Review

Introduction

The purpose of this chapter is to present a synopsis of the behavioral theories and research findings that provide a foundation for the efficacy of health and fitness course-based peer education intervention to increase physical activity among college students. The chapter contains five sections. The first section provides general impressions of chapter content, a structured view of the chapter and concludes with the methodology employed in a review of the current peer-reviewed literature. The second section looks at behavioral theories associated with the efficacy of health and fitness course-based peer education intervention to increase physical activity among college students. The third section examines previous and current peer-reviewed literature and further expands on particular aspects of persons not meeting prescribed guidelines set forth by national standards for physical activity. It also includes a historical review of college and university health and fitness course-based peer education intervention programs to increase physical activity among college students and concrete curricula utilized for increasing physical activity among this demographic group. The fourth section compares and contrasts differences in gender, class standing, and traditional versus nontraditional students and the relationship of taking a health and fitness course-based peer education intervention class and laboratory with increases in physical activity levels among college students. The fifth section summarizes correlations between literature sections, identifies gaps in the literature, and transitions into Chapter 3.

Strategy Used in the Literature Search

The search strategy utilized for the literature review was centered on the Boolean system (Whitesitt, 1961). The Boolean system uses keywords and phrases; the keywords and phrases that I used in my search included *physical activity, college students, university students, college health education, college physical education* and *college physical activity levels*.

I performed literature searches using six databases through EBSCO, PubMed, CINAHL, Academic Search Premier, ERIC, Google Scholar and online search engines Google and Yahoo. Some of the articles located were in regard to curriculum-based health education courses in higher education, increasing physical activity levels among college student populations, and foundational theories identifying predictors of behavioral outcomes for sustaining levels of physical activity both while enrolled in higher education courses and after graduation. However, a noticeable gap was observed in the scientific research regarding the effectiveness of higher education programs and their direct impact on increasing levels of physical activity among college students.

I conducted a review of each article's abstract when available, using key definitions identified in this study as an indicator of articles worthy of the literature review before the full-text article was reviewed. For abstracts that included key definitions but were not accessible online, subsequent articles were obtained through the Black Hills State University Library System or interlibrary loan system located in Rapid City, South Dakota. Articles identified as not coming from peer-reviewed sources were not utilized. Furthermore, articles that went beyond the scope or focus of what precisely

was being examined for the literature review were discarded. Lastly, articles that specifically looked at the effectiveness of higher education programs and the direct impact of increasing levels of physical activity among college students were accorded top priority for the literature review as they were limited in number.

Review of Foundational Theories

Behavior Change Interventions

Some factors that may influence physical activity participation among college students include lack of time, minimal or no social support, social phobias or anxieties, and not seeing the health benefits associated physical activity participation (Dishman, 1994; Daskapan, Tuzun, & Eker, 2006; Gomez-Lopez, Gallegos & Extremera, 2010). Also, two cognitive variables can contribute to physical activity levels: perceived benefits and perceived barriers, which both can influence either positive or negative participation in physical activity levels (Daskapan, et. al, 2006; Buckworth & Dishman, 1999). Thus, analysis of perceived variables and barriers that can impede the beginning and continuation of a physical activity program remains a critical factor in raising motivation and adherence to long-term physical activity behaviors (Gomez-Lopez et. al, 2010; Ninerola, Capdevila, & Pintanel, 2006).

Social cognitive/learning theory (SCT) proposes that behavior, personal factors, and environmental factors work to impact behavior outcomes (Boyle et al., 2011). As a result, these intertwining variables affect an individual's ability to anticipate behavioral outcomes, learning through observational outcomes, and developing confidence in self-efficacy through reflected experiences in order to adjust personal behavior (Boyle et al., 2011). According to Rovniak, Anderson, Winett, & Stephens, (2002), a positive relation

exists between social cognitive/learning theory variables and physical activity levels, with self-efficacy showing the strongest correlation with physical activity behaviors. Less research investigating the association between physical activity and self-regulation is available.

Although the number of physical activity intervention programs in higher education has decreased over the last several decades, several university-based interventions that do exist are based on social cognitive/learning theory (Boyle et. al, 2011). However, many course-based intervention efforts are not required, impacting students' willingness to take a course needed for graduation (Boyle et. al, 2011). Also, intervention measurement has been limited with very few programs utilizing peer health educators who may provide a source of social support, which has shown to be effective in small groups where interaction is more intimate (Boyle et. al, 2011).

Social Learning Theory

According to Bandura, humans are not born innately in knowing the full range of human behavior and thus critical life skills must be learned through response patterns acquired via direct experience or by observation (Bandura, 1977). "Fortunately, most human behavior is learned observationally through modeling from observing others, one forms an idea of how new behaviors are performed, and on later occasions, this coded information serves as a guide for action" (Bandura, 1977, p.22). Also, biological, genetic and hormonal factors play a crucial role in influencing physical development that can later affect behavior potentialities (Bandura, 1977). Moreover, social learning theory acts as a connection point for linking behavioral and cognitive learning theories as it utilizes

attention, memory, and motivation as the foundations for learning through modeling (Bandura, 1977).

Social learning theory posits an integrated theoretical framework for analyzing human thought and behavior, specifically looking at how observing and modeling others shapes a person's behaviors, attitudes, and emotional reactions (Bandura, 1977). "Social learning theory approaches the explanation of human behavior in terms of a continuous reciprocal interaction between cognitive, behavioral, and environmental determinants. Within the process of reciprocal determinism lies the opportunity for people to influence their destiny as well as the limits of self-direction" (Bandura, 1977, p.vii). Therefore, social learning theory posits that human behavior is a continuous reciprocal interaction between environmental, behavioral, and cognitive stimulus and requires necessary conditions for effective learning to occur (Bandura, 1977).

As social learning theory utilizes modeling as a backdrop for effective learning to occur, Bandura (1977) outlines three types of modeling stimulus that provide a person's motivation for developing a learned behavior:

- live model, observation of a person demonstrating the desired behavior;
- verbal instruction, detailed instruction from a person on how to engage in the desired behavior; and
- symbolic, stimulus from real or fictional characters from media or entertainment.

Thus, according to social learning theory, influences learned through modeling are produced through their informative function and are governed by four component processes:

- attention processes, observers must pay attention to the modeled behavior and the characteristics of the behavior or event that are influenced by the observer's perceptual and cognitive abilities;
- retention processes, recall features of the observed behavior;
- motor reproduction processes, reproductions of the observed behavior in unity with the observed model; and
- motivational processes, desire to engage or disengage from an observed behavior based on an observer's motivations that are influenced by likely consequences and standards.

As social learning theory continued to expand and evolve, Bandura (1977, 1986), renamed social learning theory to SCT, which placed more emphasis on the impacts of cognition influencing human behavior, specifically as related to personal, behavioral, and environmental influences.

Social Cognitive Theory (SCT)

As social learning theory evolved into social cognitive theory, (SCT) remained a multi-dimensional model representing human behavior in a dynamic nature; including intrapersonal/interpersonal characteristics, behavior and environmental factors while reciprocal determinism continued as a critical component of how understanding a person's environment impacted and shaped their motivations, behaviors, and overall

well-being (Nehl, Blanchard, Kupperman, Sparling, Rhodes, Torabi, & Courneya, 2012; Glanz, Rimer, & Viswanath, 2008; Bandura, 1986; Bandura, 2004). Therefore, according to Bandura (1998), a person's beliefs in their ability to regulate their motivation and personal behavior influences every phase of personal change, including playing a critical role in developing and maintaining a level of personal health.

Also, this includes the ability to organize and execute a course of action necessary to produce a particular degree of attainment which acts on other influences or determinants in regulating personal behavior (Bandura, 1998). Personal efficacy also plays a critical role in determining if a person would even consider changing their health habits, exercise motivation and perseverance need to succeed and if they decide to change, maintaining the pattern changes they have achieved, coping with possible relapse and reestablishing success in developing a sense of self-control if experiencing a setback (Bandura, 1998).

Personal beliefs regarding personal efficacy can be developed by four primary sources of influence:

- Mastery of experience (which is the effective way).
- Vicarious experiences provided by social models.
- Social persuasion.
- Reduction in stress reactions.

Personal efficacy specifically influences human health on two levels according to Bandura (1998). At the most fundamental level is a person's beliefs in their potential to cope with stressors that intern enact biological systems that regulate health and influence disease (Bandura, 1998). Thus, social cognitive theory observes stress responses by a

person's perceived inefficacy in the ability to control over threats and strenuous demands which if unresolved increases the susceptibility to illness and disease (Bandura, 1998).

The second level of self-efficacy as it affects health is by having a feeling of direct control over personal habits related to health and the progression of biological aging (Bandura, 1998). Thus, a growing body of research shows one's efficacy to affect control over personal health-related behaviors plays a central role in health status and functioning and acts as a common denominator by which diverse types of interventions influence different types of health outcomes (Bandura, 1998). "The stronger the instilled perceived self-efficacy, the more likely are people to enlist and sustain the effort needed to adopt and maintain health-promoting behavior" (Bandura, 1998, p. 628).

Physical Activity Intervention Development Utilizing Social Cognitive Theory

For course-based peer educational programs to be more efficient in developing physical activity interventions, it is critical for these interventions to be founded on theoretical models that explain and predict physical activity behaviors (Rovniak, et. al, 2002). Minimal research exists on how social cognitive theory variables influence physical activity interventions; researchers who have utilized an (SCT) model for physical activity have only used one or two components of social cognitive theory (Rovniak, et. al, 2002). Furthermore, what research has been conducted has not utilized sequencing variables in a causal order as indicated by Bandura (1995) (Rovniak, et. al, 2002).

Social Cognitive Theory and Physical Activity Behavior

According to Marcus and Forsyth (2009), social cognitive theory has been successfully applied in changing physical activity behavior. Through reciprocal

determinism and self-efficacy, the interactions among a person's environmental, personal and behavioral factors can influence behavior change. Examples include:

- Personal:
  - Previous physical activity experiences
  - Fitness Level
  - Outcome expectations
- Behavioral:
  - Enjoyable activity
  - Produces desired benefits
  - Moderate intensity
- Environmental:
  - Green space for exercise
  - Safe neighborhood
  - Exercise partner lives close by

Bandura (1998), notes; "If we are to contribute significantly to the betterment of human health, we must broaden our perspective on health promotion and disease prevention beyond the individualist level. This calls for a more ambitious socially-oriented agenda of research and social practice" (Bandura, 1998, p. 23). Moreover, gaining a better understanding of the process which influence participating in regular physical activity and can be used to design and implement more efficient exercise interventions for college age students remains critical component to helping maintain a path towards incorporating regular physical activity into college students' daily lives (Rovniak, Anderson, Winett, & Stephens, 2002).

Physical Activity Recommendations

The World Health Organization (WHO) estimates that as many as 2 million deaths per year are linked directly to physical inactivity making it one of the leading global health challenges we face in our society (Schilling, Giles-Corti, & Sallis, 2009; World Health Organization, 2005). Also, Healthy People 2020 identifies increasing participation of physical activity among adults (age 18-64), as one of the primary objectives for meeting current physical activity guidelines for aerobic and muscle-strengthening activity (U.S. Department of Health and Human Services, 2014). According to the Centers for Disease Control and Prevention 2008 Physical Activity Guidelines for Americans, adults aged 18 to 64 years old need at least:

- Two hours and 30 minutes (150 minutes) of moderate-intensity aerobic activity (e.g., brisk walking) every week or 1 hour and 15 minutes (75 minutes) of vigorous-intensity aerobic activity (e.g., jogging or running) every week or an equivalent mix of moderate and vigorous-intensity aerobic activity every week.
- Muscle-strengthening activities that work all major muscle groups (legs, hips, back, abdomen, chest, shoulders, and arms) on 2 or more days a week.

Included in this demographic group are college age students, who according to the National College Health Risk Behavior Survey, as many as 35% are currently overweight or obese and have high levels of physical inactivity (Boyle, et al., 2002).). In fact, Healthy Campus 2020 initiative identified increasing physical activity among its top priorities (American College Health Association, 2012). Also, studies regarding physical levels of among college students found between 35% to 42% do not meet the

recommended amount of physical activity based on prescribed guidelines (Miller, Staten, Rayens, &Nolan, 2005; Racette, Densinger, Strube, Highstein, & Deusigner, 2005).

Moreover, research indicates there is a steep decline in physical activity levels from high school (55%) to college (36.6%) among both young men and women, therefore, the transition from high school to college is a critical time to introduce exercise to both obese and nonobese individuals (National Association for Sport and Physical Education, 2009; Sailors, et al., 2010). Furthermore, The National College Health Assessment (NCHA) indicated 57% of college males and 61% of college females were not engaging in the recommended levels of weekly physical activity (Buckworth & Nigg, 2004).

To address this growing health concern, institutions of higher education began offering course-based, peer education intervention in physical education and health education with the goal of establishing long-term behavioral patterns in students' during their transition to adulthood (Community Preventive Services Task Force, 2013; Boyle, et al., 2002). Although these interventions include both course-based and supervised physical activity sessions, research provides insufficient evidence and have found to be only minimally effective as too few studies with non-comparable interventions could be utilized to determine their effectiveness on long-term behavior change for increasing physical activity (Community Preventive Services Task Force, 2013; Boyle, et al., 2002). In addition, few studies have assessed the prevalence of physical activity behavior and particular aspects associated with influencing physical activity adoption and maintenance among the college age student population (Buckworth, 2001; Wallace & Buckworth, 2009; Pinto, Cherico, Szymanski, & Marcus, 1998). "Evidence suggests that the key to

behavior change lies beyond mere information or compulsive sports practice and is highly dependent on individual motivation, social support, and environmental conditions (including the availability of facilities and the physical activity characteristics)"(Nahas, Goldfine, & Collins, 2003, p. 45).

Guideline Compliance

An estimated 80% of American adults and adolescents do not meet the prescribed guidelines set forth by Healthy People 2020 objectives for physical activity in both aerobic and muscle-strengthening activities (U.S. Department of Health and Human Services, 2014). Regular physical activity lowers the risk of coronary heart disease, stroke, hypertension, Type 2 diabetes, and certain forms of cancers and has been consistently identified as risk factors associated with obesity and weight gain (U.S. Department of Health and Human Services, 2014; Martens, Buscemi, Smith, & Murphy, 2012; Nelson, Gortmaker, Subramanian, &Wechsler, 2007; Jung, Bray, & Ginis, 2008). Physical activity can also help improve bone health, cardiorespiratory and muscular fitness, reduce body fat levels and symptoms of depression (U.S. Department of Health and Human Services, 2014). Regardless of the many health benefits regular physical activity provides, only 25% of adults in the U.S. report engaging in the recommended amounts of physical activity for 30 minutes of moderate intensity or 20 minutes of vigorous-intensity 3 or more days per week (Kahn, Ramsey, Brownson, Health, Howze, Powell, Stone, et al., 2002; Gold, Siegel, Russell, & Weinstein, 1996).

Behavioral scientists and physical activity professionals are currently facing two major challenging in providing health education and physical activity programs in higher education:; how to get inactive people to become active and how to get those who engage

in physical activity erratically to become active consistently and maintain a consistent level of activity (Nahas, Goldfine, & Collins, 2003). Factors such as; personal, social, economic, and environmental factors all influence physical activity levels in adolescence and adults while understanding both facilitators and barriers of physical activity remains important in both the efficiency of interventions and the knowledge base to improve physical activity levels (U.S. Department of Health and Human Services, 2014). Thus, it is evident from the high prevalence of people who do not engage in any forms of physical activity, motivating both adults and adolescents to adopt and maintain behaviors related to physical activity participation remains a major challenge (Rhodes, Fiala, & Nasuti, 2012).

Curriculum for Increasing Physical Activity

Healthy People 2020 have identified postsecondary education as one of the key factors positively associated with adult physical activity levels (U.S. Department of Health and Human Services, 2014). Some studies have shown colleges and universities requiring physical activity courses can positively impact health behavior patterns for young adults and physical activity habits established during the college years are more likely to be maintained after graduation (Sparling, 2003; Claxton & Wells, 2009; Melton, Hanson & Gross, 2010; Keating et al., 2005). Furthermore, it is widely believed physical inactivity decreases from high school to college age students while physical activity habits developed in college are likely to be maintained for years after graduation (Boyle, et al., 2002; Keating et al., 2005).

However, higher education physical activity programs have been decreasing nationally over the last several decades with over 40% of national institutions that had

previously required physical activity courses in their curriculum now having eliminated those requirements (Hensley, 1998; Melton, Hanson & Gross, 2010). Further complicating the issue is the lack of evidence, of course, based-based, peer education in higher education which has shown only minimally effectiveness for increasing physical activity among the college student population (Boyle et al., 2011).

College-based Health Education and Physical Activity Programs

Health is a dynamic process, constantly changing throughout life (Abu-Moghil, Khalaf, & Barghoti, 2010). As health behaviors are still in development during later adolescence and young adulthood, interventions to increase physical activity and improve health awareness and practices remain critical in the prevention of serious acute and chronic health problems over a lifespan (Leenders, Sherman, & Ward, 2003; U.S. Department of Health and Human Services, 1991). College and University communities continue to play a critical role in providing college students an opportunity to learn to develop healthy behaviors, such as regular participation in physical activity (Reed, & Ainsworth, 2007; Irwin, 2004; Leslie et al., 1999).Health educators and professionals' aware of the prevalence of insufficient physical activity among college students provide valuable information about the extent of the growing lack of active lifestyles within this particular population as well as the importance of prevailing in this health-related behavior (Irwin, 2007).

Higher educational programs utilize an intervention curriculum designed to increase and retain physical activity levels among college students while helping to establish lifelong physical activity habits (MMWR Recommendations and Reports, 2001). Furthermore, these courses also must include supervised activity including both

lectures or conceptually based (CPE) courses that focus on theoretical concepts about health benefits associated with regular physical activity and laboratory-type or activities-based (APE) courses focused on sport skill acquisition and preventative health measures such as healthy body composition, blood pressure, strength training techniques and cardiovascular fitness assessment (Bjerke, 2013; MMWR Recommendations and Reports, 2001).

By taking lecture and laboratory type coursework, students gain an understanding of developing physical activity goals, creating physical activity plans and building social support networks to facilitate a lifelong physical activity lifestyle (MMWR Recommendations and Reports, 2001). Thus, by the year 2000, a majority of students entering higher education were required to take at least one physical activity course before enrollment (Bjerke, 2013; Strand et al., 2010).

Physical activity courses have been offered by various higher education institutions in the U.S. for over 150 years with predominance reaching a peak offering of 94% by 1972 (Bjerke, 2013; Strand, Egeber, & Mozumdar 2010). Throughout the last 50+ years, these courses evolved to include a curriculum more focused on health and fitness than strictly on developing sport related skills (Bjerke, 2013). Before the 1970's (APE) courses were the majority, of course, offerings in higher education but by 1978, many colleges and universities increased (CPE) to (52%) compared to (33%) of (APE) courses (Bjerke, 2013). Even though curricula in health, fitness, and wellness are still current in higher education course offerings, only a third of these courses are evaluated for their effectiveness as it pertains to physical and behavior change variables (Bjerke, 2013; Dinger, Watts, Waigandt, & Whittet, 1992). Thus, researchers have argued a

literature gap exists in the assessment of health and fitness for college and university students while, no study has focused on outcomes associated with a combination of (APE) and (CPE) courses (Bjerke, 2013; Keating et al., 2005).

Curriculum for Increasing Physical Activity Among College Students

Healthy People 2020 have identified postsecondary education as one of the key factors positively associated with adult physical activity levels (U.S. Department of Health and Human Services, 2014). Some studies have shown colleges and universities requiring physical activity courses can positively impact health behavior patterns for young adults and physical activity habits established during the college years are more likely to be maintained after graduation (Sparling, 2003; Claxton & Wells, 2009; Melton, Hanson & Gross, 2010; Keating et al., 2005).

However, higher education physical activity programs have been decreasing nationally over the last several decades with over 40% of national institutions that had previously required physical activity courses in their curriculum now having eliminated those requirements to graduate with a college degree (Hensley, 1998; Melton, Hanson & Gross, 2010). Another aspect may be the potential for students' perceptions of the overall quality of the program that may result in participant retention rates being affected (Crawford, Greenwell, Damon, 2007).

Also, there have been little discussions of how to design programs that promote a lifestyle approach to health behavior with existing theories of health promotion (Gieck, & Olsen, 2007). As many adult behaviors are believed to be established during late adolescence and assumed not to be predetermined, behavior change is thought to be possible particularly those focused on prolonged positive experiences resulting in the

development of a positive attitude towards the experience (Dishman & Dunn, 1988; Silverman & Subramaniam, 1999). As a result, many college physical activity and health-related course offerings have been based on this behavioral theory (Mack & Shaddox, 2004). "This belief has led many universities to include a physical education or personal wellness requirement with the goal of developing skills and attitudes necessary for implementing positive health-related decisions. However, the effectiveness of these programs to exhibit changes in short-term attitudes has not been sufficiently demonstrated" (Mack & Shaddox, 2004, p.588).

Further complicating the issue is the lack of evidence, of course, based-based, peer education in higher education which has shown only minimally effectiveness for increasing physical activity among the college student population (Boyle, et al., 2011). What research has been done have found limited physical activity interventions had limited impact outside of the actual time frame and long-term behavioral changes suggesting a lack of long-term impact and sustainability for these types of programs (Hillsdon et al., 2005; Ferkel, Judge Stodden, & Griffin, 2014; Jung & Heald, 2009).

Motives and Perceived Barriers to Physical Activity among College Students

The lack of adherence to engaging in a long-term healthy and active lifestyle is considered one of the main obstacles when advocating physical activity (Gomez-Lopez et al., 2010). "This is because many people starting physical exercise tend to find some degree of difficulty not only in continuing with the activity undertaken but also practicing it on a regular basis" (Gomez-Lopez, et al., 2010, p. 374). As a result, gaining a better understanding of the motives and/or perceived barriers as well as specific reasons why individuals choose to participate, or not participate in physical activity remains important

in helping health and fitness professionals gain a better understanding of promotion physical activity and exercise habits (Chu, Bushman, & Woodard, 2008). Despite accumulating research showing major declines in physical activity during the transition period from late adolescence to young adulthood, this population does not get much interest in determining why the decline in physical activity levels occur (Kwan, Bray, & Ginis, 2009; Malina, 2001; Malina, 2001; Baranowski et al., 1997).

College Students' Motivation to Be Physically Active

Research regarding motivation to engage in exercise or physical activity is often associated with a function of intrinsic and extrinsic factors (Egli, Bland, Melton, & Czech, 2011; Dishman, 1984; Li, 1999; Weinberg & Silva, 1984). Intrinsic motivation variables are correlated with competence and interest-enjoyment which come from within and can influence a person's long-term maintenance of a particular behavior regardless of external rewards while extrinsic motivational variables focus on achievement of outcomes that may be irrelevant or unrelated to participation in exercise (Egli, et al., 2011; Deci, & Ryan, 1985; Sidman, Fiala, & D'Abundo, 2011; Ryan, Frederick, Lepes, Rubio, & Sheldon, 1997). Furthermore, a person who is initially extrinsic in their behavior towards physical activity can become self-determined, even if never truly intrinsically motivated towards exercise (Egli, et al., 2011; Ingledew, & Sullivan, 2002).

Thus, it remains important for the health educator to help individuals to move towards internal factors for physical activity and exercise motivation (Egli, et al., 2011; Deci, & Ryan, 1991; Deci, & Ryan, 1985). A limited amount of literature exists regarding exercise motivation by age or ethnicity (Egli, et al., 2011). Future research might also involve considering the geographical areas related to student physical activity

interests as they may differ based on location (Melton, Hansen, Gross, 2010). "Due to the changing demographics and generational characteristics of college students, it is important to continue to track reasons why college students participate in exercise and use this information to help drive health programming" (Egli, et al., 2011, p. 400).

Perceived Barriers to Engaging in Physical Activity

According to Garcia (2001), as our modern society has become increasingly more sophisticated, the impacts of these changes have influenced our social lives and personal development which in turn has helped shape our physical activity behaviors. However, although many adults do not consistently engage in physical activity throughout their lives, many do not abandon physical activity altogether and re-engage in the behavior when they have time and opportunity (Gomez-Lopez, et al., 2010). These reasons alone give merit to better understanding the perceived barriers hindering the beginning and continuation of physical activity behaviors and remain a decisive factor of adhering to an active lifestyle. Further evidence suggests adults and adolescents who are entering college overall have a positive attitude toward physical activity, high perceptions of behavioral control and intent on maintaining normal activity levels (Kwan, & Faulkner, 2011; Kwan, Bray, & Ginis, 2009). However, many students do not follow-through on their earlier intentions and as a result, become less active during the college years (Kwan et al., 2009).

Among the college student population, a diversity of perceived barriers exists related to engaging in physical activity in both external (lack of time, lack of social support, stress and tiredness associated with work or study overload and lack of facilities) and internal barriers (not liking the physical activity, not seeing the practically or

usefulness, laziness, apathy, or a lack of competence) as reasons for not adopting an active lifestyle (Gomez-Lopez, et al., 2010). Besides, these barriers also vary when compared with gender, age and perceived lack of time in the college- age population (Gomez-Lopez, et al., 2010).

According to Rovniak et al. (2006) not having enough time as one of the most significant barriers for not participating in physical activity for college students, which may be attributed to increased school work, social and family activities or working a job. Also, learning more about how these environmental influences affect college students' physical activity levels could lead to the development of appropriate interventions or changes in promoting an active lifestyle (Reed, & Phillips, 2005).

Social support also plays a critical role in maintaining an active lifestyle as college students typically have more immediate and indigenous social support groups to rely on such as; friends and peers both from home and at school (Gruber, 2008). "Research, in fact, suggests with respect to weight loss and exercise that the views of close friends are more powerful motivators than those of family" (Gruber, 2008; Okun, Karloy, & Lutz, 2002; Prochaska Rodger, & Sallis, 2002, p. 558).

Therefore, it remains critical research efforts continue to seek to identify detriments of physical activity while continuing to focus on designing and implementing interventions aimed at maintaining or increasing physical activity for this particular demographic group in order to better understand the personal, social, and environmental influences associated with physical activity at the college student level (Bray, & Born, 2004).

Relationship of Physical Activity Levels Among Selected Variables

Gender

Although research is limited regarding levels of physical activity and gender in college age students, in multiple studies college-aged men have reported to be more physically active than women with ethnicity also being identified as another variable where differences in activity levels have been observed (Lightfoot & Blanchard, 2011; Brownson, Hoehner, Day, Forthsyth & Sallis, 2009; McArthur & Raedeke, 2009; Centers for Disease Control and Prevention, 2007). Specifically, research has shown college-age men participate more often in both moderate and high-intensity physical activity when compared to college-age women who maintain lower levels of both moderate and high-intensity physical inactivity levels (Sabourin & Irwin, 2008; Leslie et al., 1999; Douglas, Collins, & Warren, 1997).

Also, several studies have shown differences between the sexes in motivational variables (Kilpatrick, Hebert & Bartholomew, 2005). For example, men have shown higher levels of motivation in physical activity than women regarding challenge, competition, social recognition, strength and endurance and weight management (Kilpatrick, 2005). Other motivational variables for physical activity such as; enjoyment, positive health, stress management, nimbleness, and revitalization have also been identified to be different between college age men and women (Kilpatrick, 2005).

Class Standing

The World Health Organization (WHO) has identified the transition from high school to college as a crucial period for increasing levels of obesity and physical inactivity (World Health Organization, 2000). Thus, the transition from high school to

college represents a major life adjustment for many college-aged students (Bray & Kwan. 2006; Pennebaker, Colder & Sharp, 1990). This subgroup is also at increased levels of physical inactivity with less than 50% reporting to engaging in recommended levels of vigorous physical activity levels and less than 20% participating in moderate intensity levels (Bray & Kwan. 2006; Centers for Disease Control and Prevention, 1997).

Traditional Versus Nontraditional students

Traditional college student (TS) can be defined as students age 18-25 living on campus and attending day classes (Kulavic, Hultquist, & Mclester, 2013; U.S. Department of Educational Center for Education Statistics, 2010). Nontraditional college student (NTS) can be defined as students aged greater than 25 who have returned to school and commute to and from campus while holding a part-full-time job and managing family and other adult responsibilities (Kulavic et. al, 2013; US Department of Educational Center for Education Statistics, 2010, Balzell & Zaichkowsky, 2008; Eppler, Carsen-plentl & Harju. 2000).

Although various factors such as; personal, social, environmental and cognitive variables are believed to be associated with increases in physical activity levels, very little if any literature exists of the influences these variables have in the differences of physical activity levels when comparing non-traditional to traditional college students (Kulavic et. al, 2013). While self-efficacy, beliefs, attitudes, and values remain a critical role in influencing a person's behavior towards physical activity, perceived barriers such as lack of time, lack of energy, and lack of willpower have been identified as a major obstacle from keeping college students from exercising (Kulavic et. al, 2013; Brown, 2005; Behrens, Dinger, Heesch & Sisson, 2005; Daskapan et al., 2006; King, Blair &

Bild, 1992). However, with college students identified as being at high risk for physical inactivity, determining what motivates college students to exercise and the perceived barriers from keeping them from exercising remains significant (Kulavic et. al, 2013).

Correlations Between Literature Sections

While it is widely known physical activity plays a critical role in both the treatment and prevention of characteristics related to health and well-being, research has shown many American adults do not meet recommended levels of physical activity regardless of key variables such as; social economic status, geographical location or current health status among others. These findings are very evident in the college student population with statistics varying among different studies of physical activity attitudes and behaviors. In fact, even with multiple studies existing on both motives and barriers related to physical activity behaviors, future research remains critical as means of gaining a better understanding of the complexities and factors related to maintaining an active lifestyle of one's lifecycle.

The college years are full of transition, thus is remains a critical period for establishing healthy behaviors that will carry over into adulthood. "Thus, a critical point in the decline of physical activity rates appears to be happening when young people transition from high school (adolescents) to college (young adults)" (Bray & Born, 2004). As (Keating et al., 2005) points out, the first step in the process of increasing physical activity for this demographic group is determining college students' physical activity patterns and key physical activity determinants. Additionally, understanding college students' physical activity behavior and its determinants can provide a fundamental basis for changing their physical activity habits while improving the overall health of this

population (Keating et al., 2005). Furthermore, colleges may want to consider if students' access to opportunities to engage in physical activity is sufficient based on their activity preferences and needs (Irwin, 2007).

Identified Gaps in the Literature

Although much research has been conducted on the factors associated with participating in physical activity among the college student population, a gap exists within the literature to the extent of both the effectiveness and efficiency of which both course-based and supervised physical activity sessions in higher education have at impacting long-term term physical activity behaviors among college students. Moreover, few studies have assessed the prevalence of physical activity behaviors and particular aspects associated with influencing physical activity adoption and maintenance among the college age student population (Buckworth, 2001; Wallace & Buckworth, 2009; Pinto, Cherico, Szymanski, & Marcus, 1998).

These identified gaps in the literature are the aim of what this study attempts to better address and understand aside from just looking specifically at the motives and barriers to physical activity participation among college students. This study is unique in that each participant identified has had the same credentials concerning the CoRequisite requirements necessary to meet the universities and the state's general requirement for having instruction focused specifically on personal health and well-being. As a result, each student was provided the equivalent knowledge, skills, and abilities necessary to both initiate and continue a physically active lifestyle.

Summary and Transition

Chapter 2 presented an overview of social learning theory and social cognitive theory that provides a health behavior model where perceived self-efficacy can both influence and impede a person's ability to adopt a healthy lifestyle. Moreover, course-based peer education intervention programs to increase physical activity among college students were presented and reviewed. Additionally, previous and current peer-reviewed literature was conferred that further expands on different aspects of not meeting prescribed guidelines set forth by national standards for physical activity as it relates to the college student population.

A review was offered of college and university health and fitness course-based peer education intervention programs and specific curriculum utilized for increasing physical activity among this demographic group. Section three closes by comparing and contrasting differences in gender, class standing and traditional vs. non-traditional students and the relationship of taking a health and fitness course-based peer education intervention class and laboratory. The chapter concludes by looking at the correlations between literature sections, identifies gaps in the literature and transitions into Chapter 3.

Given the magnitude of health implications associated with physical activity levels and the impacts a physically active lifestyle has on the individual college student, a greater understanding of the motives and barriers related to physical activity levels among this demographic group remains critical in improving and maintaining health while impacting social change now and in the future.

Chapter 3: Research Method

Introduction

This chapter describes the research methods used in this study to investigate college age students who have completed a college-level health education lecture course and laboratory to gain a better understanding of developing and improving interventions targeted at increasing physical activity levels among the college student population. Specifically, the study aimed to understand better how college students' physical activity habits, physical activity determinants, and self-efficacy levels influence their physical activity levels.

Variables

The independent variables examined in the study are gender, class standing, and traditional versus nontraditional students. The dependent variables are measured by Godin-Leisure-Time Exercise Questionnaire, Exercise Motivations Inventory – (EMI -2), and Process of Change (Questionnaire 4.1).This chapter describes the data collection design, research design sample, data analyses, and human subject protection. It concludes with a summary.

Data Collection

Data collection was based on survey results of undergraduate students who have previously completed a college-level health education lecture course and laboratory. The college-level health education lecture course and laboratory introduced the importance of personal wellness and fitness and provided the necessary knowledge and skills needed to make informed decisions leading to the development of a healthy lifestyle. Students were

identified and contacted to volunteer to participate in the study based on their prior completion of a college-level health education lecture course and laboratory.

Data Collection Design

Volunteer recruitment consisted of contacting an initial pool of 876 candidates who have completed a college-level health education lecture course and laboratory. Students were sent a welcoming letter and consent form via e-mail explaining the study and with a link to SurveyMonkey to take the surveys online.

Population and Sample Size

Participants were drawn from a comprehensive public institution located in the upper Midwestern United States with a student population of close to 5,000 students at both a main campus and branch campus. As part of this study, a G*Power statistical analyses was performed on preexisting data from a pool of 876 candidates who completed a college-level health education lecture course and laboratory. A total of 264 students were chosen for this study as this number provides an efficient multiple regression and meets the criteria for the central limit theorem, which states that for a sample size larger than about 30, the sampling distribution doesn't matter, as the sampling distribution will draw near normality (Cohen, 1988; Burkholder, 2012). In the event the pool of 876 candidates did not meet the G*Power statistical analyses number of 264 in an allotted time period of two weeks to complete the surveys, a larger pool of candidates would have been drawn from the admissions office by requesting IRB approval at the public comprehensive institution of those students who had been determined to have completed a college-level health education lecture course and laboratory at both the main campus and branch campus.

Participants' data was separated into sections to include both men and women and subsections of those who were freshmen, sophomores, juniors, and seniors, and further separated between those who had been identified as traditional versus nontraditional students based on their age and where they took a college-level health education lecture course and laboratory, at either the main campus or branch campus.

Instrumentation

Assessments of participant physical activity behavior, physical activity motivation, and behavior change related to physical activity was assessed using the Godin Leisure-Time Exercise Questionnaire, found in Appendix C, Exercise Motivation Inventory-2, found in Appendix D and Appendix E, and the Processes of Change Physical Activity Questionnaire 4.1, found in Appendix F and Appendix G (Godin & Shephard, 1997; Markland and Hardy, 1993; Marcus et al., 1992).

Table 1

Characteristics of Godin Leisure-Time Exercise Questionnaire, Exercise Motivation Inventory-2 and Processes of Change (Questionnaire 4.1)

Author	Assessment questionnaire	Purpose
Godin & Shepard, 1997	Godin Leisure-Time Exercise Questionnaire	A simple questionnaire designed to measure a person's leisure time physical activity habits.

(table continues)

		Considered to be reliable and valid while easy to complete quickly without a need for detailed review. Can be used to evaluate the impact of health promotion programs.
Markland & Ingledew, 1997	Exercise Questionnaire Inventory-2 (EMI-2)	Developed as a means of assessing regular activity participation. Used to identify patterns, habits and specific reasons for engaging in physical activity behavior. Can be utilized in both gender and stages of change research studies involving physical activity and exercise behaviors.
Marcus & Forsyth, 2009	Processes of Change (Questionnaire 4.1)	Measures how shifts in physical activity behavior occur. The processes of change are the strategies and techniques people use to change their thinking and behavior. When people's scores on these items increase, it is usually a good indicator that they are becoming active.

Validity

Internal validity implies an absolute measure of a variable to the degree to which an instrument assesses the actual exposure of interest (Hagstromer, Oja, & Sjostrom, 2005; Welk, 2002). According to Campbell and Stanley (1963), there are multiple factors that can threaten internal validity of experiments including history, maturation, and selection of subjects. History played a critical role in this study because it related to changes in both class design and departmental budget availability; both had occurred since preexisting data was obtained and could have influenced data measurement obtained from surveys.

Moreover, maturation or the passage of time needed to be taken into consideration as preexisting data was obtained over time, specifically over the course of multiple semesters and various school years which could also have impacted survey results. Also, this study relied on a varied selection of study subjects; therefore, selection bias of subjects needed to be taken into consideration to protect the integrity of the research findings. Threats to internal validity could have been unique as they related specifically to physical activity studies in that physical activity is a result of multidimensional exposure; therefore, it could have been difficult to find an exact absolute measure for it (Hagstromer, Oja & Sjostrom, 2005).

External validity can be understood as the ability to generalize results to other participants, settings, and measures (Campbell &Stanley, 1963). Two of these may include reactive or interactive effects of testing and interaction of selection bias and the experimental treatment (Campbell &Stanley, 1963). Both reactive or interactive effects of testing and interaction of selection bias and experimental treatment could threaten

external validity in this study as participants might alter their survey answers to show higher levels of physical activity compared to students who have not taken the corequisite and laboratory. What's more, study participants would have been aware of the correlation existing between health and low levels of physical activity as presented in the corequisite and laboratory, therefore influencing the data they provided on the surveys. Both internal and external validity threats were taken into consideration for this dissertation. Specific discussions involving threats to internal and external validity will be further examined in Chapter 5.

Reliability

Reliability pertains to the consistency or repeatability of a measure or, more precisely, how far a particular test, procedure, or tool will produce similar results in different circumstances if nothing else has been changed (Thomas, Nelson, & Silverman, 2015; Roberts, Priest & Traynor, 2006). Reliability is necessary because a test cannot be considered valid if it is determined not to be reliable on successive trials (Thomas et al., 2015). Test reliability is sometimes discussed regarding observed score, true score, and error score (Thomas et al., 2015). Observed score consists of a test subject's true score, while error score characterizes a test subject's real score and does not contain measurement error (Thomas et al., 2015). Error score can be expressed as the observed score attributed to measurement error (Thomas et al., 2015).

To measure the reliability of the data collection tools used, stability, alternate-forms, and internal consistency is different types of coefficients of reliability used, which produce different estimates when tested against each other (Twycross & Shields, 2004; Knapp, 1998; Carter & Porter, 2000; Peat, 2002). Stability pertains to an instrument that

is believed to be stable, which is true if the same results are obtained on repeated tests using the test-retest method to the same test subjects on different occasions, while a reliability coefficient provides a measure of how reliable the tool is (Twycross & Shields, 2004; Knapp, 1998; Carter & Porter, 2000; Peat, 2002). Alternate-forms involve the construction of two tests that supposedly sample the same material (Thomas et al., 2015). Internal consistency is an estimate of the reliability that represents the consistency of scores within a test and is assessed using a split-half technique (Thomas et al., 2015).

Although an observed score is obtained, it is not known if a valid assessment has been achieved due to measurement error that may occur because of the test directions, instrumentation used, test scoring, or the person's emotional or physical state (Thomas et al., 2015). As such, a reliability of 80-90 percent is recommended for most research purposes for it to be considered reliable (Roberts et al., 2006).

Data Handling

Data Transfer, Translation, Cleaning, and Organizing

Data transfer. Upon receiving IRB approval, pre-existing raw data from the CoRequisite was downloaded from the hard drive of a computer system connected to an encrypted portable hard drive and uploaded to this investigator's personal laptop computer. Of the health assessment data retained of 876 students who previously completed a college-level health education lecture course and laboratory, 264 were asked to volunteer to participate in this study. The study was limited in that all study volunteers were enrolled at either the main campus or branch campus from a comprehensive public institution located in the upper Midwestern United States.

Data translation. A Microsoft Excel spreadsheet was created by copying previous data obtained from students who have completed a college-level health education lecture course and laboratory. Once the test subjects were identified for the study, data was cleaned and organized for statistical analysis using SPSS v23 (Laureate Education, 2015).

Data cleaning and organizing. Data transferred from the computer system was scrubbed of all personal information other than study ID numbers, age, gender, and class standing of the students.

Data Analysis

This study employed a descriptive survey design utilizing a series of T-Tests and Analysis of Variance (ANOVA) to determine if there are significant differences in physical activity behavior.

Limitations

Potential limitations and plausible explanations include the following.

Estimating physical activity behavior can vary considerably and is dependent on the types of measures employed (Sarkin, Nichols, Sallis, & Calfas, 2000; Pauline, 2013).

Survey measures have only modest correspondence with objective measures of physical activity and can be greatly influenced by expenses associated with objective measures making them impractical due to limited funding and resources available (Westerterp, 2001; LaPortc, Montoyc, & Caspersen, 1985; Pauline, 2013).

This study will be limited to only college students attending a four-year university (both in a traditional and non-traditional setting) in Western South Dakota which could

result in limited generalizability of students who attend community college, colleges outside the United States, colleges with different admission and demographic profiles, or young adults who do not go to college (Pauline, 2013).

Role of the Student Researcher

For this doctoral dissertation, the student researcher was the sole investigator who has outlined in writing the theoretical foundations and extensive literature search findings used in support of this study. Also, this student researcher was also directly involved in developing design methodology and maintaining research protocol. To minimize research bias, understanding bias is essential for the conduct of sound research studies (Gerhard, 2008). Also, the researcher should attempt to avoid bias through the design of the study while adjusting for bias in the study analysis if bias cannot be avoided (Gerhard, 2008). Moreover, it is important to quantify and discuss the effects of residual bias on the results of the study (Gerhard, 2008).Finally, this student researcher was responsible for gathering, reviewing and interpreting research findings of data analysis and reporting of results for all writings for publication.

Protection of Human Subjects

Data used in this study was from pre-existing data obtained from students who had previously enrolled in a college-level based health education course and laboratory. Approval for the study was obtained by two Institutional Review Boards (IRB), the dissertation committee and the University Research Reviewer before data collection and analysis was performed. Upon completion of the on-line surveys, data was stored in electronic format at this researcher's personal office and will not be made available to

others. All student data was scrubbed of personal information by the student investigator with study identifier numbers assigned to each student's individual set of data.

Dissemination of Findings

Study findings will be disseminated by way of a dissertation manuscript. Possible publications such as those dealing with health education and promotion, physical activity and those dealing specifically with issues associated with college health will be considered an option upon completion of the study.

Summary and Transition

This chapter described the research methodology including the use of a self-administered questionnaire, study design and approach, population and sample size, instrumentation, data collection, data handling, data analysis and protection of human subjects. Chapter 4 will describe the data collection and data analysis conducted to address the study's three research questions.

Chapter 4: Results

Introduction

The purpose of this study was to examine current physical activity levels of college age students who have completed a college-level health education lecture course and laboratory to gain a better understanding of developing and improving interventions targeted at increasing physical activity behaviors among the college student population. In spite of the well-recognized health benefits associated with physical activity, a high percentage of college students within the United States remain physically inactive, which may contribute to serious health problems (Woekel et al., 2013; Irwin, 2007). Therefore, declining levels of physical activity are now being recognized as a major global health problem, making it one of the leading causes of mortality worldwide. Determining the magnitude of the association between physical activity levels and the college age student population is an important initial step in developing appropriate interventions.

This study sought to explore the following three research questions:

RQ1: What are the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among male and female college students?

RQ2: What are the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) of male and female college students?

RQ3: What are the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among traditional college students vs. non-traditional college students?

This chapter presents the findings of survey results from 70 college-age students who had previously completed a college-level health education corequisite. Participants were drawn from a comprehensive public institution located in the upper Midwestern United States with a student population of close to 5,000 students at both a main campus and branch campus. Candidates were identified and contacted to volunteer to participate in the study based on their prior completion of a college-level health education lecture course and laboratory.

Chapter 4 concludes by explaining the procedures for data collection and analysis, including a time frame for data collection, actual recruitment, response rates, and results of tests performed to answer the proposed research questions and test the hypothesis for each research question.

Data Collection

Before describing the findings of the study related to the research questions, it is appropriate to explain how the data was handled, including approval and consent, population and sample size, data transfer, and data cleaning and organizing.

Approval and Consent

Prior to receiving approval to conduct the study, written endorsements were obtained for the Basic/Refresher Curriculum Completion Report and Physical Science Responsible Conduct of Research Curriculum Completion Report found in Appendix A and Appendix B. In addition, two separate Institutional Review Boards applications were submitted and approved from Black Hills State University (Project H-14-19) and Walden University IRB number 06-30-16-0117561.

Written endorsements to use the Godin Leisure Time Questionnaire found in Appendix H and Process of Change (Questionnaire 4.1) found in Appendix J were obtained prior to initiating the study. The Exercise Motivation Inventory-2 (EMI-2) found in Appendix I was determined to be an open source survey; no written endorsement was needed. Consent was received from students via e-mail using a combined invitation letter and consent form with a link to take the survey online through SurveyMonkey.

Instrumentation

An online survey was created on SurveyMonkey consisting of 98 multiple choice questions including, age, gender, and class standing using the Godin Leisure-Time Exercise Questionnaire (GLQ), Exercise Motivation Inventory-2 (EMI-2) and Processes of Change Physical Activity Questionnaire 4.1 (Godin & Shephard, 1997; Markland & Hardy, 1993; Marcus et al., 1992).

Population and Sample Size

Volunteer recruitment consisted of contacting an initial pool of 876 candidates who had completed a college-level health education corequisite. After initial contact was made and the allotted period of two weeks to complete the surveys had expired, it was apparent with a response rate of 6 students that the initial pool of 876 candidates' responses was insufficient in order to meet a valid multiple regression score of 264 student responses as was determined in achieving the criteria for the central limit theorem.

After receiving dissertation committee approval, a larger pool of candidates was drawn from the admissions office at the comprehensive institution of students at both the main campus and branch campus who had completed the college-level health education

corequisite. Again, consent was obtained from students via email using a combined invitation letter and consent form with a link to take the surveys online through SurveyMonkey. After contact was made and the allotted period of two weeks to complete the surveys had expired, response rates had increased to 33 students; however, the number remained insufficient to meet a valid multiple regression score of 264 student responses as was determined in achieving the criteria for the central limit theorem. At this time, I was instructed to allow candidates more allotted time to complete the online surveys to try and improve the survey participation rate. After a 60 day period, the study was closed online; with a final participation rate of 70 students.

Data Transfer

Data was transferred from the online survey into a Microsoft Excel spreadsheet.

Data Cleaning and Organizing

Data was scrubbed of all personal information except for participants' age, gender, and class standing. Data was organized into age, gender, and class standing and each survey question was numbered individually for statistical analysis using SPSS v23 (Laureate Education, 2015).

Data Analysis

This study employed a descriptive survey design utilizing a series of *t* tests and analysis of variance (ANOVA) to determine if there were significant differences in physical activity behaviors among respondents. Due to the lack of meeting an efficient multiple regression score of 264 student responses to address the criteria for the central limit theorem, SPSS bootstrapping was used in SPSS v23 (Laureate Education, 2015) for data analysis of this research. According to International Business Machines Corporation

(n.d.), SPSS bootstrapping is efficient way to test the reliability and stability of analytical models while providing accurate results.

Demographic Results

Age. Of the 70 survey respondents, 51 identified themselves as 18 to 24 years of age, 14 identified themselves as 25 to34 years old, 3 identified themselves as 35 to 44 years old. Only 2 identified themselves as 55 years or older. Table 2 and Figure 2 portray the age breakdown.

Table 2

Age

Answer choices	Responses	Overall
Age		
18 to 24	72.9%	51
25 to 34	20.0%	14
35 to 44	4.3%	3
45 to 54	0.0%	0
55 to 64	1.4%	1
65 to 74	0.0%	0
75 or older	1.4%	1
Total		70

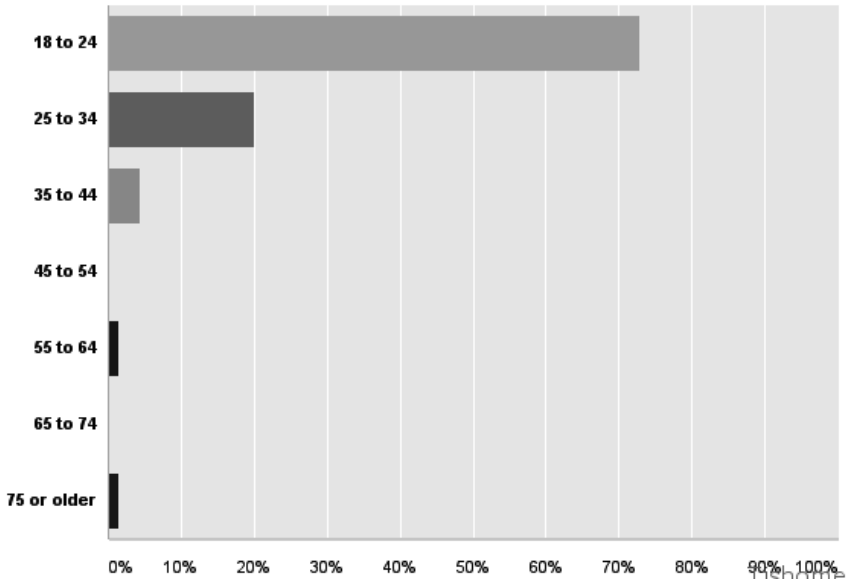

Figure 2. Age of survey respondents

Gender. As shown in Table 3 and Figure 3, of the 70 survey respondents, 54 identified themselves as female, 16 identified themselves as male.

Table 3

Gender

Answer choices	Responses	Overall
Gender		
Female	77.1%	54
Male	22.9%	16
Total		70

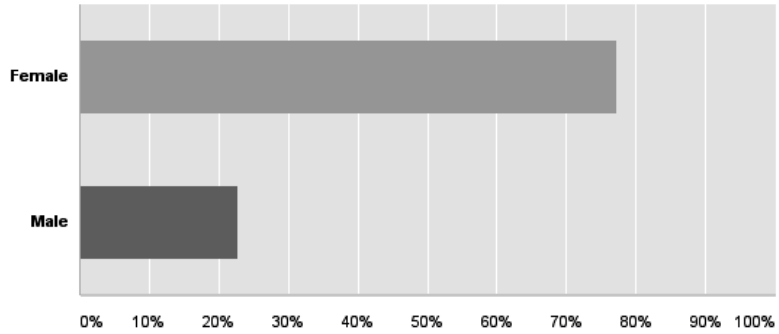

Figure 3. Gender of survey respondents

Class standing. Of the 70 survey respondents, 3 identified themselves as freshman, 10 as sophomore, 17 as junior, and 40 as senior (Table 3 and Figure 4).

Table 4

Class standing

Answer choices	Responses	Overall
Class standing		
Freshman	4.3%	3
Sophomore	14.3%	10
Junior	24.3%	17
Senior	57.1%	40
Total		70

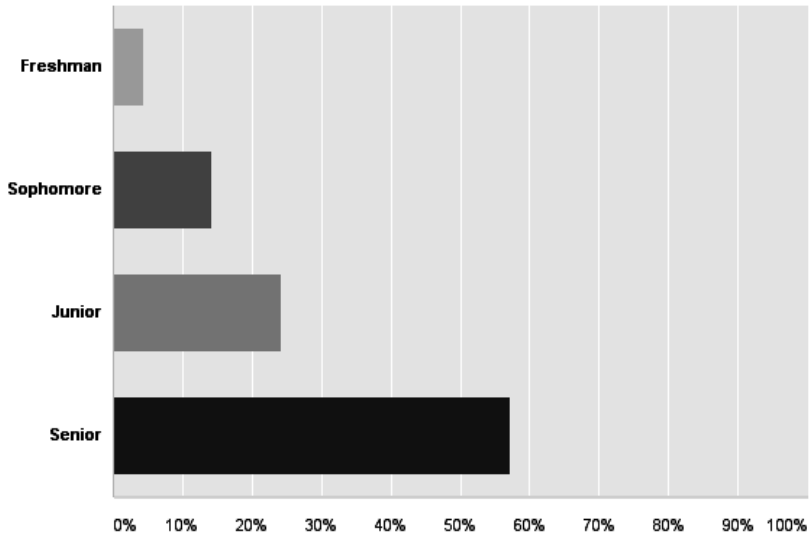

Figure 4. Class standing of survey respondents

Research Question 1

RQ1: What are the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among male and female college students?

To investigate if there are differences in physical activity habits, physical activity determinants, and self-efficacy levels among male and female college students, an independent samples *t* test with bootstrap resampling was conducted. The baseline measures of male and female college students were evaluated using the Godin Leisure-Time Exercise Questionnaire, the Processes of Change Physical Activity Questionnaire 4.1, and the Exercise Motivation Inventory (EMI-2), with the following subscales: stress management, revitalization, enjoyment, challenge, social recognition, affiliation, competition, health pressures, ill-health avoidance, positive health, weight management, appearance, strength and endurance, and nimbleness. The statistical analysis was conducted using SPSS v23. The bootstrap resampling was set for 1,000 samples with replacements. Confidence intervals were set for 95%. Data are mean ± standard deviation unless otherwise stated. The total sample size (N = 53) consisted of females (n = 41) and of males (n = 12). Table 5, Gender (*t* test), Table 6, Levene's Test for Equality of Variances (Gender), and Table 7, Bootstrap for Independent Samples Test (Gender) provide further statistical analysis for each questionnaire.

Godin Leisure-Time Exercise Questionnaire. The overall baseline measure of the Godin Leisure-Time Exercise Questionnaire [M = 1.73, SD = 0.69, SEM = 0.15, *95% CI* (1.43, 2.04)]. The baseline of the Godin Leisure-Time Exercise Questionnaire was slightly higher for females [M = 1.78, SD = .73, SEM = 0.11, *95% CI* (1.56, 2.00)] compared to males [M = 1.67, SD = 0.65, SEM = 0.19, *95% CI* (1.30, 2.08)]. However,

the difference in means was not statistically significant [$p > .05$]. There was homogeneity of variances for engagement scores for females and males, as assessed by Levene's test for equality of variances ($p = .656$). These results were further supported by bootstrap resampling. The bootstrap resampling baseline measure of the Godin Leisure-Time Exercise Questionnaire was the same for equal variances assumed, 95% CI [-.37, 0.53] compared with equal variances not assumed, 95% CI [-.37, 0.53]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = 0.11, *SED* = 0.23, 95% CI (-.37, 0.53)].

Processes of Change Physical Activity Questionnaire 4.1. The overall baseline measure of the Processes of Change Physical Activity Questionnaire 4.1 [*M* = 121.15, *SD* = 31.41, *SEM* =7.11, *95% CI* (105.36, 133.71)]**.** The baseline measure of the Processes of Change Physical Activity Questionnaire 4.1was slightly lower for females [*M* = 118.46, *SD* = 29.55, *SEM* = 4.62, *95% CI* (108.48, 126.80)] compared to males [*M* = 123.83, *SD* = 33.26, *SEM* = 9.60, *95% CI* (102.23, 140.61)]. However, the difference in means was not statistically significant [$p > .05$]. There was homogeneity of variances for engagement scores for males and females, as assessed by Levene's test for equality of variances ($p = .871$). These results were further supported by bootstrap resampling. The bootstrap resampling baseline measure of the Processes of Change Physical Activity Questionnaire 4.1 was the same for equal variances assumed 95% CI [-23.7, 17.12] compared with equal variances not assumed 95% CI [-23.7, 17.12]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = -5.37, *SED* = 10.44, 95% CI (-23.7, .17.12)].

Exercise Motivation Inventory (EMI-2). ***Stress management.*** The overall baseline measure of stress management [*M* = 12.77, *SD* = 5.53, *SEM* =1.16, *95% CI* (10.18, 14.75)]. The baseline measure of stress management was slightly lower for females [*M* = 11.37, *SD* = 6.46, *SEM* = 1.00, *95% CI* (9.24, 13.25)] compared to males [*M* = 14.17, *SD* = 4.59, *SEM* = 1.32, *95% CI* (11.11, 16.25)]. However, the difference in means was not statistically significant [*p* > .05]. There was homogeneity of variances for engagement scores for males and females for stress management, as assessed by Levene's test for equality of variances (*p* = .051). These results were further supported by bootstrap resampling. The bootstrap resampling baseline measure of stress management was the same for equal variances assumed 95% CI [-5.68, 0.80] compared with equal variances not assumed 95% CI [-5.68, 0 80]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = -2.80, *SED* = 1.66, 95% CI (-5.68, 080)].

Revitalization. The overall baseline measure of revitalization [*M* = 8.92, *SD* = 4.05, *SEM* = 0.87, *95% CI* (7.09, 10.48)]. The baseline measure of revitalization was slightly lower for females [*M* = 7.34, *SD* = 4.51, *SEM* = 0.71, *95% CI* (5.97, 8.69)] compared to males [*M* = 10.50, *SD* = 3.58, *SEM* = 1.03, *95% CI* (8.20, 12.27)]. However, the difference in means was not statistically significant [*p* > .05]. There was homogeneity of variances for engagement scores for males and females revitalization, as assessed by Levene's test for equality of variances (*p* = .311). The bootstrap resampling baseline measure of revitalization was the same for equal variances assumed 95% CI [-5.52, -0.48] compared with equal variances not assumed 95% CI [-5.52, -0.48]. With equal variances

assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = -3.16, *SED* = 1.25, 95% CI (-5.52, -0.48)].

Enjoyment. The overall baseline measure of enjoyment [*M* = 11.43, *SD* = 6.81, *SEM* =1.58, *95% CI* (8.28, 14.31)]. The baseline measure of enjoyment was slightly lower for females [*M* = 9.85, *SD* = 7.30, *SEM* = 1.34, *95% CI* (7.48, 12.18)] compared to males [*M* = 13.00, *SD* = 6.31, *SEM* = 1.82, *95% CI* (9.08, 16.44)]. However, the difference in means was not statistically significant [$p > .05$]. There was homogeneity of variances for engagement scores for males and females for enjoyment, as assessed by Levene's test for equality of variances ($p = .082$). The bootstrap resampling baseline measure of enjoyment was the same for equal variances assumed, 95% CI [-7.19, 1.18] compared with equal variances not assumed 95% CI [-7.19, 1.18]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = -3.15, *SED* = 2.13, 95% CI (-7.19, 1.18)].

Challenge. The overall baseline measure of challenge [*M* = 10.34, *SD* = 5.52, *SEM* =1.05, *95% CI* (7.98, 12.35)]. The baseline measure of challenge was slightly lower for females [*M* = 9.00, *SD* = 6.17, *SEM* = 0.96, *95% CI* (7.19, 10.69)] compared to males [*M* = 11.67, *SD* = 4.87, *SEM* = 1.41, *95% CI* (8.77, 14.00)]. However, the difference in means was not statistically significant [$p > .05$]. There was homogeneity of variances for engagement scores for males and females for challenge, as assessed by Levene's test for equality of variances ($p = .182$). The bootstrap resampling baseline measure of challenge was the same for equal variances assumed 95% CI [-5.76, 0.70] compared with equal variances not assumed 95% CI [-5.76, 0.70]. With equal variances assumed, the

independent samples *t* test with bootstrap resampling calculated [*MD* = -2.67, *SED* = 0.08, 95% CI (-5.76, 0.70)].

Social recognition. The overall baseline measure of social recognition [*M* = 5.32, *SD* = 5.05, *SEM* =1.11, *95% CI* (3.20, 7.59)]. The baseline measure of social recognition was slightly lower for females [*M* = 4.63, *SD* = 5.25, *SEM* = 0.82, *95% CI* (3.00, 6.17)] compared to males [*M* = 6.00, *SD* = 4.84, *SEM* = 1.40, *95% CI* (3.40.4, 9.00)]. However, the difference in means was not statistically significant [*p* > .05]. There was homogeneity of variances for engagement scores for males and females for social recognition, as assessed by Levene's test for equality of variances (*p* = .051). The bootstrap resampling baseline measure of social recognition was the same for equal variances assumed 95% CI [-4.84, 1.67] compared with equal variances not assumed 95% CI [-4.84, 1.67]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = -1.37, *SED* = -0.06, 95% CI (-4.84, 1.67)].

Affiliation. The overall baseline measure of affiliation [*M* = 5.91, *SD* = 5.49, *SEM* =1.32, *95% CI* (3.19, 8.50)]. The baseline measure of affiliation was slightly lower for females [*M* = 3.56, *SD* = 4.02, *SEM* = 0.63, *95% CI* (2.38, 4.86)] compared to males [*M* = 8.25, *SD* = 6.96, *SEM* = 2.00, *95% CI* (4.00, 12.14)]. However, the difference in means was not statistically significant [*p* > .05]. The assumption of homogeneity of variances was violated, as assessed by Levene's test for equality of variances (*p* = .001). The bootstrap resampling baseline measure of affiliation was the same for equal variances assumed 95% CI [-8.73, -.17] compared with equal variances not assumed 95% CI [-8.73, -.17]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = -4.69, *SED* = 2.17, 95% CI (-8.73, -.17)].

Competition. The overall baseline measure of competition [*M* = 6.54, *SD* = 6.82, *SEM* =1.57, *95% CI* (3.37, 9.47)]. The baseline measure of competition was slightly lower for females [*M* = 4.83, *SD* = 6.06, *SEM* = 0.95, *95% CI* (2.98, 6.65)] compared to males [*M* = 8.25, *SD* = 7.58, *SEM* = 2.19, *95% CI* (3.75, 12.29)]. However, the difference in means was not statistically significant [*p* > .05]. There was homogeneity of variances for engagement scores for males and females for competition, as assessed by Levene's test for equality of variances (*p* = .247). The bootstrap resampling baseline measure of competition was the same for equal variances assumed 95% CI [-8.06, -.1.43] compared with equal variances not assumed 95% CI [-8.06, -.1.43]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = -3.42, *SED* = 2.36, 95% CI (-8.06, 1.43)].

Health pressures. The overall baseline measure of health pressures [*M* = 4.20, *SD* = 3.78, *SEM* = 0.86, *95% CI* (2.59, 5.90)]. The baseline measure of health pressures was slightly lower for females [*M* = 3.32, *SD* = 3.49, *SEM* = 0.55, *95% CI* (2.28, 4.30)] compared to males [*M* = 5.08, *SD* = 4.06, *SEM* = 1.17, *95% CI* (2.90, 7.50)]. However, the difference in means was not statistically significant [*p* > .05]. There was homogeneity of variances for engagement scores for males and females for health pressures, as assessed by Levene's test for equality of variances (*p* = .961). The bootstrap resampling baseline measure of health pressures was the same for equal variances assumed 95% CI [-4.4, 0.69] compared with equal variances not assumed 95% CI [-4.4, 0.69]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = -1.77, *SED* = 1.27, 95% CI (-4.38, 0.69)].

Ill-health avoidance. The overall baseline measure of ill-health avoidance [*M* = 10.20, *SD* = 4.26, *SEM* = 0.98, *95% CI* (8.15, 11.88)]. The baseline measure of ill-health avoidance was slightly lower for females [*M* = 9.39, *SD* = 3.77, *SEM* = 0.59, *95% CI* (8.22, 10.51)] compared to males [*M* = 11.00, *SD* = 4.75, *SEM* = 1.37, *95% CI* (8.07, 13.25)]. However, the difference in means was not statistically significant [$p > .05$]. There was homogeneity of variances for engagement scores for males and females for ill-health avoidance, as assessed by Levene's test for equality of variances ($p = .419$). The bootstrap resampling baseline measure of ill-health avoidance was the same for equal variances assumed, 95% CI [-4.25, 1.57] compared with equal variances not assumed, 95% CI [-4.25, 1.57]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = -1.61, *SED* = 1.47, 95% CI (-4.25, 1.57)].

Positive health. The overall baseline measure of positive health [*M* = 11.69, *SD* = 4.45, *SEM* = 0.65, *95% CI* (10.03, 13.00)]. The baseline measure of positive health was slightly lower for females [*M* = 11.20, *SD* = 5.48, *SEM* = 0.54, *95% CI* (10.15, 12.17)] compared to males [*M* = 12.17, *SD* = 3.41, *SEM* = 0.98, *95% CI* (9.90, 13.83)]. However, the difference in means was not statistically significant [$p > .05$]. There was homogeneity of variances for engagement scores for males and females for positive health, as assessed by Levene's test for equality of variances ($p = .930$). The bootstrap resampling baseline measure of positive health was the same for equal variances assumed 95% CI [-3.00, 1.45] compared with equal variances not assumed 95% CI [-3.00, 1.45]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = -0.97, *SED* = 1.13, 95% CI (-3.00, 1.45)].

Weight management. The overall baseline measure of weight management [*M* = 11.81, *SD* = 6.28, *SEM* =1.44, *95% CI* (8.86, 14.29)]. The baseline measure of weight management was slightly higher for females [*M* = 12.20, *SD* = 5.74, *SEM* = 0.90, *95% CI* (10.25, 13.88)] compared to males [*M* = 11.42, *SD* = 6.82, *SEM* = 1.97, *95% CI* (7.46, 14.69)]. However, the difference in means was not statistically significant [$p > .05$]. There was homogeneity of variances for engagement scores for males and females for weight management, as assessed by Levene's test for equality of variances ($p = .122$). The bootstrap resampling baseline measure of weight management was the same for equal variances assumed 95% CI [-3.23, 5.03] compared with equal variances not assumed 95% CI [-3.23, 5.03]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = 0.78, *SED* = 2.08, 95% CI (-3.23, 5.03)].

Appearance. The overall baseline measure of appearance [*M* = 11.50, *SD* = 5.32, *SEM* =1.21, *95% CI* (9.02, 13.68)]. The baseline measure of appearance was slightly lower for females [*M* = 11.07, *SD* = 4.93, *SEM* = 0.77, *95% CI* (9.64, 12.56)] compared to males [*M* = 11.92, *SD* = 5.70, *SEM* = 1.64, *95% CI* (8.39, 14.80)]. However, the difference in means was not statistically significant [$p > .05$]. There was homogeneity of variances for engagement scores for males and females for appearance, as assessed by Levene's test for equality of variances ($p = .545$). The bootstrap resampling baseline measure of appearance was the same for equal variances assumed 95% CI [-4.07, 5.03] compared with equal variances not assumed 95% CI [-4.07, 5.03]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = -.84, *SED* = 1.84, 95% CI (-4.07, 5.03)].

Strength and endurance. The overall baseline measure of strength and endurance [*M* = 14.24, *SD* = 4.79, *SEM* = 0.98, *95% CI* (12.3, 16.01)]. The baseline measure of strength was slightly lower for females [*M* = 12.73, *SD* = 6.10, *SEM* = 0.95, *95% CI* (10.88, 14.51)] compared to males [*M* = 15.75, *SD* = 3.47, *SEM* = 1.00, *95% CI* (13.67, 17.50)].However, the difference in means was not statistically significant [*p* > .05]. The assumption of homogeneity of variances was violated, as assessed by Levene's test for equality of variances (*p* = .006). The bootstrap resampling baseline measure of strength and endurance was the same for equal variances assumed 95% CI [-5.46, -.30] compared with equal variances not assumed 95% CI [-5.46, -.30]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* =-3.2, *SED* = 1.35, 95% CI (-5.46, -.30)].

Nimbleness. The overall baseline measure of nimbleness [*M* = 7.55, *SD* = 4.51, *SEM* =1.04, *95% CI* (5.33, 9.48)]. The baseline measure of nimbleness was slightly lower for females [*M* = 7.44, *SD* = 3.93, *SEM* = 0.61, *95% CI* (6.24, 8.63)] over males [*M* = 7.67, *SD* = 5.09, *SEM* = 1.47, *95% CI* (4.42, 10.33)]. However, the difference in means was not statistically significant [*p* > .05]. There was homogeneity of variances for engagement scores for males and females for nimble, as assessed by Levene's test for equality of variances (*p* = .091). The bootstrap resampling baseline measure of nimbleness was the same for equal variances assumed 95% CI [-3.19, 3.41] compared with equal variances not assumed 95% CI [-3.19, 3.41]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* =- 0.23, *SED* = 1.61, 95% CI (-3.19, 3.41)].

Table 5

Gender (t test)

						Bootstrap 95% confidence interval	
	Gender		Statistic	Bias	Std. error	Lower	Upper
GLQ	Female	N	41				
		Mean	1.78	.00	.11	1.56	2.00
		Std. Deviation	.725	-.012	.057	.596	.826
		Std. Error Mean	.113				
	Male	N	12				
		Mean	1.67	.00	.19	1.30	2.08
		Std. Deviation	.651	-.042	.115	.422	.837
		Std. Error Mean	.188				
Process of change	Female	N	41				
		Mean	118.463	.0569	4.546	108.479	126.805
		Std. Deviation	29.553	-.468	3.604	22.075	36.101
		Std. Error Mean	4.615				
	Male	N	12				
		Mean	123.833	-.7358	9.562	102.228	140.613
		Std. Deviation	33.264	-2.744	9.283	11.924	48.586
		Std. Error Mean	9.603				
Stress management	Female	N	41				
		Mean	11.366	-.014	1.012	9.239	13.249
		Std. Deviation	6.460	-.102	.498	5.386	7.318
		Std. Error Mean	1.008				
	Male	N	12				
		Mean	14.167	-.076	1.317	11.111	16.250
		Std. Deviation	4.589	-.419	1.502	1.389	6.726
		Std. Error Mean	1.325				

(table continues)

						Bootstrap 95% confidence interval	
	Gender		Statistic	Bias	Std. error	Lower	Upper
Revitalization	Female	N	41				
		Mean	7.342	-.021	.692	5.974	8.694
		Std. Deviation	4.514	-.056	.353	3.786	5.118
		Std. Error Mean	.705				
	Male	N	12				
		Mean	10.500	-.30	1.042	8.201	12.272
		Std. Deviation	3.580	-.212	.715	1.921	4.705
		Std. Error Mean	1.033				
Enjoyment	Female	N	41				
		Mean	9.853	-.015	1.138	7.47	12.177
		Std. Deviation	7.299	-.095	.402	6.359	7.958
		Std. Error Mean	1.139				
	Male	N	12				
		Mean	13.000	-.100	1.837	9.083	16.436
		Std. Deviation	6.310	-.424	1.291	3.127	8.276
		Std. Error Mean	1.821				
Challenge	Female	N	41				
		Mean	9.000	.003	.923	7.190	10.689
		Std. Deviation	6.168	-.100	..528	4.987	7.052
		Std. Error Mean	.963				
	Male	N	12				
		Mean	11.667	-.075	1.345	8.771	14.000
		Std. Deviation	4.868	-.377	1.269	2.348	6.870
		Std. Error Mean	1.405				

(table continues)

	Gender		Statistic	Bias	Std. error	Bootstrap 95% confidence interval Lower	Upper
Social recognition	Female	N	41				
		Mean	4.634	-.020	.808	3.000	6.170
		Std. Deviation	5.248	-.092	.453	4.178	5.938
		Std. Error Mean	.820				
	Male	N	12				
		Mean	6.000	.044	1.43	3.401	9.000
		Std. Deviation	4.843	-.339	1.18	2.328	6.823
		Std. Error Mean	1.398				
Affiliation	Female	N	41				
		Mean	3.561	.006	.632	2.380	4.857
		Std. Deviation	4.019	-.0667	.413	3.049	4.665
		Std. Error Mean	.628				
	Male	N	12				
		Mean	8.250	-.224	2.086	4.000	12.142
		Std. Deviation	6.956	-.405	1.027	4.581	8.539
		Std. Error Mean	2.008				
Competition	Female	N	41				
		Mean	4.829	.004	.929	2.978	6.650
		Std. Deviation	6.058	-.123	.766	4.163	7.257
		Std. Error Mean	.946				
	Male	N	12				
		Mean	8.250	-.172	2.159	3.751	12.285
		Std. Deviation	7.581	-.465	1.212	4.163	9.124
		Std. Error Mean	2.188				

(table continues)

	Gender		Statistic	Bias	Std. error	Bootstrap 95% confidence interval Lower	Upper
Health pressures	Female	N	41				
		Mean	3.317	-.024	.507	2.275	4.302
		Std. Deviation	3.488	-.083	.408	2.632	4.202
		Std. Error Mean	.544				
	Male	N	12				
		Mean	5.083	-.086	1.167	2.900	7.498
		Std. Deviation	4.055	-.382	1.170	1.202	5.624
		Std. Error Mean	1.170				
Ill-health avoidance	Female	N	41				
		Mean	9.390	-.019	.579	8.222	10.511
		Std. Deviation	3.774	-.087	.414	2.883	4.524
		Std. Error Mean	.589				
	Male	N	12				
		Mean	11.000	-.083	1.361	8.071	13.249
		Std. Deviation	4.748	-.320	1.112	2.260	6.456
		Std. Error Mean	1.370				
Positive health	Female	N	41				
		Mean	11.195	-.007	.526	10.150	12.170
		Std. Deviation	3.480	-.076	.477	2.468	4.347
		Std. Error Mean	.543				
	Male	N	12				
		Mean	12.166	-.032	.999	9.900	13.833
		Std. Deviation	3.406	-.207	.660	1.851	4.387
		Std. Error Mean	.983				

(table continues)

	Gender		Statistic	Bias	Std. error	Bootstrap 95% confidence interval Lower	Upper
Weight management	Female	N	41				
		Mean	12.195	-.010	.908	10.250	13.878
		Std. Deviation	5.741	-.100	.546	4.494	6.654
		Std. Error Mean	.896				
	Male	N	12				
		Mean	11.416	-.133	1.866	7.455	14.687
		Std. Deviation	6.815	-.308	.746	4.990	7.623
		Std. Error Mean	1.967				
Appearance	Female	N	41				
		Mean	11.073	.024	.754	9.639	12.557
		Std. Deviation	4.931	-.059	.483	3.859	5.796
		Std. Error Mean	.770				
	Male	N	12				
		Mean	11.916	-.039	1.658	8.385	14.799
		Std. Deviation	5.696	-.332	1.088	2.875	7.155
		Std. Error Mean	1.644				
Strength and endurance	Female	N	41				
		Mean	12.731	-.003	.929	10.875	14.512
		Std. Deviation	6.095	-.090	.515	4.984	7.033
		Std. Error Mean	.951				
	Male	N	12				
		Mean	15.750	-.046	.961	13.667	17.498
		Std. Deviation	3.467	-.228	.740	1.566	4.484
		Std. Error Mean	1.000				

(table continues)

						Bootstrap 95% confidence interval	
	Gender		Statistic	Bias	Std. error	Lower	Upper
Nimbleness	Female	N	41				
		Mean	7.439	.020	.600	6.237	8.628
		Std. Deviation	3.930	-.058	.350	3.129	4.505
		Std. Error Mean	.613				
	Male	N	12				
		Mean	7.666	-.056	1.486	4.417	10.333
		Std. Deviation	5.087	-.269	.796	3.039	5.896
		Std. Error Mean	1.468				

Table 6

Levene's Test for Equality of Variances (Gender)

Independent samples test

		Levene's test for equality of variances		*t* test for equality of means						
									95% confidence interval of the difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	Lower	Upper
GLQ	Equal variances assumed	.201	.656	.489	51	.627	.114	.233	-.354	.581
	Equal variances not assumed			.519	19.711	.610	.114	.219	-.344	.572
Processes of change	Equal variances assumed	.027	.871	-.538	51	.593	-5.369	9.975	-25.395	14.655
	Equal variances not assumed			-.504	16.428	.621	-5.369	10.654	-27.908	17.168
Stress management	Equal variances assumed	3.982	.051	-1.398	51	.168	-2.800	2.003	-6.823	1.222
	Equal variances not assumed			-1.682	25.136	.105	-2.800	1.665	-6.229	.627
Revitalization	Equal variances assumed	1.049	.311	-2.222	51	.031	-3.158	1.421	-6.011	-.305
	Equal variances not assumed			-2.525	22.292	.019	-3.158	1.251	-5.751	-.565
Enjoyment	Equal variances assumed	3.145	.082	-1.351	51	.183	-3.146	2.329	7.823	1.530
	Equal variances not assumed			-1.464	20.441	.158	-3.146	2.148	-7.622	1.329

(table continues)

Independent samples test

		Levene's test for equality of variances		*t* test for equality of means						
									95% confidence interval of the difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	Lower	Upper
Challenge	Equal variances assumed	1.832	.182	-1.374	51	.175	-2.666	1.940	-6.562	1.228
	Equal variances not assumed			-1.565	22.408	.132	-2.666	1.703	-6.196	.862
Social recognition	Equal variances assumed	2.274	.138	-.806	51	.424	-1.365	1.694	-4.767	2.036
	Equal variances not assumed			-.843	19.234	.410	-1.365	1.620	-4.754	2.023
Affiliation	Equal variances assumed	12.312	.001	-2.972	51	.005	-4.689	1.577	-7.856	-1.521
	Equal variances not assumed			-2.229	13.220	.044	-4.689	2.103	-9.226	-.1516
Competition	Equal variances assumed	1.374	.247	-1.624	51	.111	-3.420	2.106	-7.648	.807
	Equal variances not assumed			-1.435	15.348	.171	-3.420	2.384	-8.492	1.651
Health pressures	Equal variances assumed	.002	.961	-1.487	51	.143	-1.766	1.187	-4.150	.618
	Equal variances not assumed			-1.368	16.074	.190	-1.766	1.291	-4.502	.970

(table continues)

Independent samples test

		Levene's test for equality of variances		*t* test for Equality of Means						
									95% confidence interval of the difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	Lower	Upper
Ill-health avoidance	Equal variances assumed	.663	.419	-1.225	51	.226	-1.609	1.314	-4.248	1.028
	Equal variances not assumed			-1.079	15.300	.297	-1.609	1.492	-4.784	1.565
Positive health	Equal variances assumed	.008	.930	-.854	51	.397	-.971	1.137	-3.254	1.311
	Equal variances not assumed			-.865	18.276	.398	-.971	1.123	-3.329	1.386
Weight management	Equal variances assumed	2.469	.122	.396	51	.694	.778	1.965	-3.167	4.724
	Equal variances not assumed			.360	15.856	.724	.778	2.162	-3.808	5.365
Appearance	Equal variances assumed	.372	.545	-.503	51	.617	-.843	1.675	-4.207	2.521
	Equal variances not assumed			-.465	16.142	.648	-.843	1.815	-4.690	3.003
Strength and endurance	Equal variances assumed	8.239	.006	-1.633	51	.109	-3.018	1.848	-6.730	.693
	Equal variances not assumed			-2.185	32.589	.036	-3.018	1.381	-5.830	-.206

(table continues)

Independent samples test

		Levene's test for equality of variances		*t* test for equality of means						
									95% confidence interval of the difference	
		F	Sig.	t	df	Sig. (2-tailed)	Mean difference	Std. error difference	Lower	Upper
Nimbleness	Equal variances assumed	2.968	.091	-.165	51	.870	-.227	1.380	-2.999	2.544
	Equal variances not assumed			-.143	15.054	.888	-.227	1.591	-3.619	3.163

Table 7

Bootstrap for Independent Samples Test (Gender)

		Bootstrap for independent samples test					
						Bootstrap 95% confidence interval	
		Mean difference	Bias	Std. error	Sig. (2-tailed)	Lower	Upper
GLQ	Equal variances assumed	.114	-.002	.227	.624	-.372	.528
	Equal variances not assumed	.114	-.002	.227	.634	-.372	.528
Processes of change	Equal variances assumed	-5.369	.792	10.440	.580	23.744	17.119
	Equal variances not assumed	-5.369	.792	10.440	.598	23.744	17.119
Stress management	Equal variances assumed	-2.800	.062	1.656	.089	-5.682	.795
	Equal variances not assumed	-2.800	.062	1.656	.116	-5.682	.795
Revitalization	Equal variances assumed	-3.158	.008	1.251	.016	-5.520	-.476
	Equal variances not assumed	-3.158	.008	1.251	.030	-5.520	-.476
Enjoyment	Equal variances assumed	-3.146	.085	2.131		-7.188	1.175
	Equal variances not assumed	-3.146	.085	2.131		-7.188	1.175

(table continues)

Bootstrap for independent samples test

		Mean difference	Bias	Std. error	Sig. (2-tailed)	Bootstrap 95% confidence interval Lower	Upper
Challenge	Equal variances assumed	-2.666	.0778	1.627	.108	-5.763	.703
	Equal variances not assumed	-2.666	.0778	1.627	.125	-5.763	.703
Social recognition	Equal variances assumed	-1.365	-.0639	1.646	.418	-4.835	1.666
	Equal variances not assumed	-1.365	-.0639	1.646	.425	-4.835	1.666
Affiliation	Equal variances assumed	-4.689	.230	2.166	.042	-8.731	-.170
	Equal variances not assumed	-4.689	.230	2.166	.050	-8.731	-.170
Competition	Equal variances assumed	-3.420	.175	2.355	.153	-8.056	1.430
	Equal variances not assumed	-3.420	.175	2.355	.156	-8.056	1.430
Health pressures	Equal variances assumed	-1.766	.0619	1.267	.173	-4.375	.687
	Equal variances not assumed	-1.766	.0619	1.267	.214	-4.375	.687

(table continues)

Bootstrap for independent samples test

		Mean difference	Bias	Std. error	Sig. (2-tailed)	Bootstrap 95% confidence interval Lower	Upper
Ill-health avoidance	Equal variances assumed	-1.609	.0641	1.469	.268	-4.246	1.566
	Equal variances not assumed	-1.609	.0641	1.469	.296	-4.246	1.566
Positive health	Equal variances assumed	-.971	.0249	1.129	.396	-3.009	1.451
	Equal variances not assumed	-.971	.0249	1.129	.409	-3.009	1.451
Weight management	Equal variances assumed	.778	.123	2.075		-3.223	5.026
	Equal variances not assumed	.778	.123	2.075		-3.223	5.026
Appearance	Equal variances assumed	-.843	.063	1.839	.651	-4.067	3.245
	Equal variances not assumed	-.843	.063	1.839	.652	-4.067	3.245
Strength and endurance	Equal variances assumed	-3.018	.0438	1.350	.031	-5.463	-.300
	Equal variances not assumed	-3.018	.0438	1.350	.035	-5.463	-.300

(table continues)

		Bootstrap for independent samples test					
						Bootstrap 95% confidence interval	
		Mean difference	Bias	Std. error	Sig. (2-tailed)	Lower	Upper
Nimbleness	Equal variances assumed	-.227	.077	1.608	.877	-3.193	3.409
	Equal variances not assumed	-.227	.077	1.608	.877	-3.193	3.409

Research Question 2

RQ2: What are the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) of male and female college students?

To investigate if there are differences in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) male and female college students, a one-way ANOVA was conducted. The baseline measures of freshman, sophomore, junior and senior college students were evaluated using the Processes of Change Physical Activity Questionnaire 4.1.and the Exercise Motivation Inventory (EMI-2), scoring them by 14 subscales (Stress Management, Revitalization, Enjoyment, Challenge, Social Recognition, Affiliation, Competition, Health Pressures, Ill-Health Avoidance, Positive Health, Weight Management, Appearance, Strength and Endurance and Nimbleness).The statistical analysis was conducted using SPSS v23. The bootstrap resampling was set for 1000 samples with replacements. Confidence intervals were set for 95%. Data are mean ± standard deviation, unless otherwise stated. The total sample size [N = 52] consisted of

freshman [*n* = 2], sophomore [*n* = 7], junior, [*n* = 12], and senior [*n* = 31]. Table 8, One-way ANOVA, provides further statistical analysis for each questionnaire.

Processes of Change Physical Activity Questionnaire 4.1. A one-way ANOVA was conducted to determine the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) college students. Participants were classified into four groups: freshman (*n* = 2), sophomore (*n* = 7), junior (*n* = 12) and senior (*n* = 31). Data is presented as mean square for between groups and within groups. Between groups decreased [*M* = 889.41] compared to within groups [*M* = 912.39], but the differences between these groups was not statistically significant, $F(3, 52) = .975$, $p = 0.412$.

Exercise Motivation Inventory (EMI-2). ***Stress management.*** A one-way ANOVA was conducted to determine the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) college students. Participants were classified into four groups: freshman (*n* = 2), sophomore (*n* = 7), junior (*n* = 12) and senior (*n* = 31). Data is presented as mean square for between groups and within groups. Between groups increased [*M* = 57.52] compared to within groups [*M* = 36.76], but the differences between these groups was not statistically significant, $F(3, 52) = 1.57$, $p = 0.210$.

Revitalization. A one-way ANOVA was conducted to determine the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) college students. Participants were classified into four groups: freshman (*n* = 2), sophomore (*n* = 7), junior (*n* = 12) and senior (*n* = 31). Data is presented as mean square for between groups and

within groups. Between groups increased [*M* = 48.32] compared to within groups [*M* = 18.45], but the differences between these groups was not statistically significant, *F*(3, 52) = 2.67, *p* = 0.61.

Enjoyment. A one-way ANOVA was conducted to determine the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) college students. Participants were classified into four groups: freshman (*n* = 2), sophomore (*n* = 7), junior (*n* = 12) and senior (*n* = 31). Data is presented as mean square for between groups and within groups. Between groups increased [*M* = 76.71] compared to within groups [*M* = 49.61], but the differences between these groups was not statistically significant, *F*(3, 52) = 2.67, *p* = 0.61.

Challenge. A one-way ANOVA was conducted to determine the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) college students. Participants were classified into four groups: freshman (*n* = 2), sophomore (*n* = 7), junior (*n* = 12) and senior (*n* = 31). Data is presented as mean square for between groups and within groups. Between groups increased [*M* = 53.97.71] compared to within groups [*M* = 34.42], but the differences between these groups was not statistically significant, *F*(3, 52) = 1.57, *p* = 0.21.

Social recognition. A one-way ANOVA was conducted to determine the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) college students. Participants were classified into four groups: freshman (*n* = 2), sophomore (*n* =

7), junior (n = 12) and senior (n = 31). Data is presented as mean square for between groups and within groups. Between groups decreased [M =20.36] compared to within groups [M = 26.85], but the differences between these groups was not statistically significant, $F(3, 52) = 0.758$, $p = 0.52$.

Affiliation. A one-way ANOVA was conducted to determine the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) college students. Participants were classified into four groups: freshman (n = 2), sophomore (n = 7), junior (n = 12) and senior (n = 31). Data is presented as mean square for between groups and within groups. Between groups decreased [M =10.44] compared to within groups [M = 27.57], but the differences between these groups was not statistically significant, $F(3, 52) = 0.38$, $p = 0.77$.

Competition. A one-way ANOVA was conducted to determine the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) college students. Participants were classified into four groups: freshman (n = 2), sophomore (n = 7), junior (n = 12) and senior (n = 31). Data is presented as mean square for between groups and within groups. Between groups decreased [M =48.46] compared to within groups [M = 42.11], but the differences between these groups was not statistically significant, $F(3, 52) = 1.51$, $p = 0.34$.

Health pressures. A one-way ANOVA was conducted to determine the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) college

students. Participants were classified into four groups: freshman (n = 2), sophomore (n = 7), junior (n = 12) and senior (n = 31). Data is presented as mean square for between groups and within groups. Between groups decreased [M =10.23] compared to within groups [M = 13.59], but the differences between these groups was not statistically significant, $F(3, 52) = 0.75$, $p = 0.53$.

Ill-health avoidance. A one-way ANOVA was conducted to determine the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) college students. Participants were classified into four groups: freshman (n = 2), sophomore (n = 7), junior (n = 12) and senior (n = 31). Data is presented as mean square for between groups and within groups. Between groups decreased [M =10.47] compared to within groups [M = 16.54], but the differences between these groups was not statistically significant, $F(3, 52) = 0.63$, $p = 0.60$.

Positive health. A one-way ANOVA was conducted to determine the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) college students. Participants were classified into four groups: freshman (n = 2), sophomore (n = 7), junior (n = 12) and senior (n = 31). Data is presented as mean square for between groups and within groups. Between groups increased [M =16.48] compared to within groups [M = 11.66], but the differences between these groups was not statistically significant, $F(3,52) = 1.41$, $p = 0.25$.

Weight management. A one-way ANOVA was conducted to determine the differences, if any, in physical activity habits, physical activity determinants, and self-

efficacy levels among class standing (freshmen, sophomore, junior, or senior) college students. Participants were classified into four groups: freshman (n = 2), sophomore (n = 7), junior (n = 12) and senior (n = 31). Data is presented as mean square for between groups and within groups. Between groups increased [M =54.13] compared to within groups [M = 34.14], but the differences between these groups was not statistically significant, $F(3,52) = 1.59$, $p = 0.21$.

Appearance. A one-way ANOVA was conducted to determine the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) college students. Participants were classified into four groups: freshman (n = 2), sophomore (n = 7), junior (n = 12) and senior (n = 31). Data is presented as mean square for between groups and within groups. Between groups increased [M =68.65] compared to within groups [M = 23.07], but the differences between these groups was statistically significant, $F(3,52) = 2.98$, $p = 0.04$.

Strength and endurance. A one-way ANOVA was conducted to determine the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) college students. Participants were classified into four groups: freshman (n = 2), sophomore (n = 7), junior (n = 12) and senior (n = 31). Data is presented as mean square for between groups and within groups. Between groups increased [M =36.83] compared to within groups [M = 32.50], but the differences between these groups was not statistically significant, $F(3,52) = 1.13$, $p = 0.35$.

Nimbleness. A one-way ANOVA was conducted to determine the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) college students. Participants were classified into four groups: freshman (n = 2), sophomore (n = 7), junior (n = 12) and senior (n = 31). Data is presented as mean square for between groups and within groups. Between groups increased [M =50.92] compared to within groups [M = 15.32], but the differences between these groups was statistically significant, $F(3,52) = 3.32$, $p = 0.03$.

Table 8

One-Way ANOVA

		Sum of squares	df	Mean square	F	Sig.
Process of change	Between groups	2668.221	3	889.407	.975	.412
	Within groups	44707.326	49	912.394		
	Total	47375.547	52			
Stress management	Between groups	172.567	3	57.522	1.565	.210
	Within groups	1801.433	49	36.764		
	Total	1974.000	52			
Revitalization	Between groups	144.945	3	48.315	2.619	.061
	Within groups	903.885	49	18.447		
	Total	1048.830	52			
Enjoyment	Between groups	230.120	3	76.707	1.546	.214
	Within groups	2430.899	49	49.610		
	Total	2661.019	52			
Challenge	Between groups	161.923	3	53.974	1.568	.209
	Within Groups	1686.756	49	34.424		
	Total	1848.679	52			
Recognize	Between groups	61.074	3	20.358	.758	.523
	Within groups	1315.756	49	26.852		
	Total	1376.830	52			

(table continues)

		Sum of squares	df	Mean square	F	Sig.
Affiliation	Between groups	31.317	3	10.439	.379	.769
	Within groups	1351.135	49	27.574		
	Total	1382.453	52			
Competition	Between groups	145.365	3	48.455	1.151	.338
	Within groups	2063.314	49	42.108		
	Total	2208.679	52			
Health pressures	Between groups	30.691	3	10.230	.753	.526
	Within groups	666.064	49	13.593		
	Total	696.755	52			
Ill-health avoidance	Between groups	31.413	3	10.471	.633	.597
	Within groups	810.399	49	16.539		
	Total	841.811	52			
Positive health	Between groups	49.439	3	16.480	1.413	.250
	Within groups	571.429	49	11.662		
	Total	620.868	52			
Weight management	Between groups	162.381	3	54.127	1.586	.205
	Within groups	1672.600	49	34.135		
	Total	1834.981	52			

(table continues)

		Sum of squares	df	Mean square	F	Sig.
Appearance	Between groups	205.945	3	68.648	2.976	.041
	Within groups	1130.357	49	23.069		
	Total	1336.302	52			
Strength and endurance	Between groups	110.487	3	36.829	1.133	.345
	Within groups	1592.381	49	32.498		
	Total	1702.868	52			
Nimbleness	Between groups	152.753	3	50.918	3.324	.027
	Within groups	750.493	49	15.316		
	Total	903.245	52			

Research Question 3

RQ3: What are the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among traditional college students vs. non-traditional college students?

To investigate if there are differences in physical activity habits, physical activity determinants, and self-efficacy levels among traditional college students vs. non-traditional college students, an independent samples *t* test with bootstrap resampling was conducted. The baseline measures of traditional college students vs. non-traditional college students were evaluated using the Godin Leisure-Time Exercise Questionnaire, the Processes of Change Physical Activity Questionnaire 4.1.and the Exercise Motivation Inventory (EMI-2), Subscales: (Stress Management, Revitalization, Enjoyment, Challenge, Social Recognition, Affiliation, Competition, Health Pressures, Ill-Health Avoidance, Positive Health, Weight Management, Appearance, Strength and Endurance

and Nimbleness). The statistical analysis was conducted using SPSS v23. The bootstrap resampling was set for 1000 samples with replacements. Confidence intervals were set for 95%. Data are mean ± standard deviation, unless otherwise stated. The total sample size [*N* = 53] consisted of traditional college students [*n* = 40] and of non-traditional college students [*n* = 13]. Table 9, Traditional and Non-traditional (t-test), Table 10, Levene's Test for Equality of Variances (Traditional and Non-traditional), and Table 11, Bootstrap for Independent Samples Test (Traditional and Non-traditional) provides further statistical analysis for each questionnaire.

Godin Leisure-Time Exercise Questionnaire. The overall baseline measure of the Godin Leisure-Time Exercise Questionnaire [*M* = 1.92 *SD* = 0.69, *SEM* =.16, *95% CI* (1.60, 2.18)]. The baseline of the Godin Leisure-Time Exercise Questionnaire was slightly lower for traditional college students [*M* = 1.63, *SD* = 0.68, *SEM* = 0.11, *95% CI* (1.41, 1.83)] compared to non-traditional college students [*M* = 2.20, *SD* = 0.69, *SEM* = 0.20, *95% CI* (1.78, 2.53)]. However, the difference in means was not statistically significant [*p* > .05]. There was homogeneity of variances for engagement scores for males and females exercise frequency, as assessed by Levene's test for equality of variances (*p* = .487). These results were further supported by bootstrap resampling. The bootstrap resampling baseline measure of the Godin Leisure-Time Exercise Questionnaire was the same for equal variances assumed 95% CI [-.970, -.101] compared with equal variances not assumed 95% CI [-.970, -.101]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = -.529, *SED* = .214, 95% CI ([-.970, -.101].

Processes of Change Physical Activity Questionnaire 4.1. The overall baseline measure of the Processes of Change Physical Activity Questionnaire 4.1 [*M* = 118.47, *SD* = 31.5, *SEM* =7.1, *95% CI* (102.74, 132.77)]**.** The baseline measure of the Processes of Change Physical Activity Questionnaire 4.1was slightly lower for traditional college students [*M* = 120.85, *SD* = 34.43, *SEM* = 8.08, *95% CI* (112.84, 128.17)] compared to non-traditional college students [*M* = 116.08, *SD* = 44.18, *SEM* = 12.25, *95% CI* (92.63, 137.37)]. However, the difference in means was not statistically significant [*p* > .05]. The assumption of homogeneity of variances was violated, as assessed by Levene's test for equality of variances (*p* = .015). These results were further supported by bootstrap resampling. The bootstrap resampling baseline measure of the Processes of Change Physical Activity Questionnaire 4.1 was the same for equal variances assumed 95% CI [-18.64, 30.63] compared with equal variances not assumed 95% CI [-18.64, 30.63]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = 4.77, *SED* = 12.27, 95% CI (-18.64, 30.63)].

Exercise Motivation Inventory (EMI-2). ***Stress management.*** The overall baseline measure of stress management [*M* = 13.0, *SD* = 5.5, *SEM* =1.2, *95% CI* (12.47, 10.20)]. The baseline measure of stress management was slightly lower for traditional college students [*M* = 12.60, *SD* = 5.62, *SEM* =.89, *95% CI* (10.73, 6.23)] compared to non-traditional college students [*M* = 10.15, *SD* = 7.55, *SEM* = 2.09, *95% CI* (14.20, 14.16)]. However, the difference in means was not statistically significant [*p* > .05]. There was homogeneity of variances for engagement scores for males and females revitalize, as assessed by Levene's test for equality of variances (*p* = .051). These results were further supported by bootstrap resampling. The bootstrap resampling baseline

measure of stress management was the same for equal variances assumed 95% CI [-1.74, 6.90] compared with equal variances not assumed 95% CI [-1.74, 6.90]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = -2.45, *SED* = 2.21, 95% CI (-1.74, 6.90)].

Revitalization. The overall baseline measure of revitalization [*M* = 8.9, *SD* = 11.1, *SEM* =4.1, *95% CI* (5.45, 9.47)]. The baseline measure of revitalization was slightly lower for traditional college students [*M* = 7.47, *SD* = 4.68, *SEM* = 1.06, *95% CI* (7.33, 9.83)] compared to non-traditional college students [*M* = 6.31, *SD* = 5.22, *SEM* = 1.45, *95% CI* (3.56, 9.11)]. However, the difference in means was not statistically significant [$p > .05$]. There was homogeneity of variances for engagement scores for males and females revitalize, as assessed by Levene's test for equality of variances ($p = .192$). The bootstrap resampling baseline measure of revitalization was the same for equal variances assumed 95% CI [-6.7, 5.34] compared with equal variances not assumed 95% CI [-6.7, 5.34]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = 2.32, *SED* = 1.55, 95% CI (-6.7, 5.34)].

Enjoyment. The overall baseline measure of enjoyment [*M* = 9.78, *SD* = 7.57, *SEM* =1.71, *95% CI* (6.45, 12.97)]. The baseline measure of enjoyment was slightly lower for traditional college students [*M* = 11.33, *SD* = 6.59, *SEM* = 1.04, 95% CI (9.22, 13.23)] compared to non-traditional college students [*M* = 8.23, *SD* = 8.54, *SEM* = 2.37, 95% CI (3.67, 12.70)]. However, the difference in means was not statistically significant [$p > .05$]. There was homogeneity of variances for engagement scores for males and females for enjoy, as assessed by Levene's test for equality of variances ($p = .055$). The bootstrap resampling baseline measure of enjoyment was the same for equal variances

assumed 95% CI [-1.75, 8.23] compared with equal variances not assumed 95% CI [-1.75, 8.23]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = 3.10, *SED* = 2.53, 95% CI (-1.75, 8.23)].

Challenge. The overall baseline measure of challenge [*M* = 9.35, *SD* = 8.10, *SEM* =1.56, *95% CI* (6.36, 12.20)]. The baseline measure of challenge was slightly higher for traditional college students [*M* = 9.85, *SD* = 5.10, *SEM* = .81, 95% CI (8.31, 11.47)] compared to non-traditional college students [*M* = 8.85, *SD* = 8.28, *SEM* = 2.30, 95% CI (4.40, 12.92)]. However, the difference in means was not statistically significant [*p* > .05]. There was homogeneity of variances for engagement scores for males and females for challenge, as assessed by Levene's test for equality of variances (*p* = .182). The bootstrap resampling baseline measure of challenge was the same for equal variances assumed 95% CI [-3.62, 5.83] compared with equal variances not assumed 95% CI [-3.62, 5.83]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = 1.00, *SED* = 2.37, 95% CI (-3.62, 5.83)].

Social recognition. The overall baseline measure of recognition [*M* = 4.66, *SD* = 5.37, *SEM* =1.20, *95% CI* (2.56, 7.00)]. The baseline measure of social recognition was slightly higher for traditional college students [*M* = 5.23, *SD* = 4.98, *SEM* = .79, 95% CI (3.80, 6.89)] compared to non-traditional college students [*M* = 4.08, *SD* = 5.75, *SEM* = 1.60, 95% CI (1.31, 7.10)]. However, the difference in means was not statistically significant [*p* > .05]. There was homogeneity of variances for engagement scores for males and females for social recognition, as assessed by Levene's test for equality of variances (*p* = .644). The bootstrap resampling baseline measure of recognition was the same for equal variances assumed 95% CI [-2.22, 4.45] compared with equal variances

not assumed 95% CI [-2.22, 4.45]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = 1.15, *SED* = 1.72, 95% CI (-2.22, 4.45)].

Affiliation. The overall baseline measure of affiliation [*M* = 5.17, *SD* = 5.48, *SEM* =1.24, *95% CI* (2.87, 7.69)]. The baseline measure of affiliation was slightly lower for traditional college students [*M* = 4.10, *SD* = 4.73, *SEM* = .75, 95% CI (2.73, 5.63)] over non-traditional college students [*M* = 6.23, *SD* = 6.23, *SEM* = 1.73, 95% CI (3.00, 9.75)]. However, the difference in means was not statistically significant [*p* > .05]. There was homogeneity of variances for engagement scores for males and females for recognition, as assessed by Levene's test for equality of variances (*p* = .107). The bootstrap resampling baseline measure of affiliation was the same for equal variances assumed 95% CI [-5.84, 1.41] compared with equal variances not assumed 95% CI [-5.84, 1.41]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = -2.13, *SED* = 1.83, 95% CI (-5.84, 1.41)].

Competition. The overall baseline measure of competition [*M* = 5.25, *SD* = 6.71, *SEM* =1.48, *95% CI* (2.63, 8.18)]. The baseline measure of competition was slightly higher for traditional college students [*M* = 5.95, *SD* = 6.40, *SEM* = 1.01, 95% CI (4.10, .8.15)] compared to non-traditional college students [*M* = 4.54, *SD* = 7.01, *SEM* = 1.94, 95% CI (1.16, 8.20)]. However, the difference in means was not statistically significant [*p* > .05]. There was homogeneity of variances for engagement scores for males and females for competition, as assessed by Levene's test for equality of variances (*p* = .849). The bootstrap resampling baseline measure of competition was the same for equal variances assumed 95% CI [-2.64, -5.65] compared with equal variances not assumed

95% CI [-2.64, -5.65]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = 1.41, *SED* = 2.13, 95% CI (-2.64, -5.65)].

Health pressures. The overall baseline measure of health pressures [*M* = 3.71, *SD* = 3.68, *SEM* =.77, *95% CI* (2.23, 5.32)]. The baseline measure of health pressures was slightly lower for traditional college students [*M* = 3.73, *SD* = 3.80, *SEM* = .60, 95% CI (2.53, 5.00)] compared to non-traditional college students [*M* = 3.69, *SD* = 3.35, *SEM* =.93, 95% CI (1.92, 5.64)]. However, the difference in means was not statistically significant [*p* > .05]. There was homogeneity of variances for engagement scores for males and females for pressures, as assessed by Levene's test for equality of variances (*p* = .696). The bootstrap resampling baseline measure of health pressures was the same for equal variances assumed 95% CI [-2.22, 2.08] compared with equal variances not assumed 95% CI [-2.22, 2.08]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = .33, *SED* = -.03, 95% CI (-2.22, 2.08)].

Ill-health avoidance. The overall baseline measure of ill-health avoidance [*M* = 9.81, *SD* = 4.13, *SEM* =.91, *95% CI* (8.04, 11.46)]. The baseline measure of ill-health avoidance was slightly lower for traditional college students [*M* = 9.70, *SD* = 4.00, *SEM* = .633, 95% CI (8.49, 10.92)] compared to non-traditional college students [*M* = 9.92, *SD* = 4.25, *SEM* = 1.18, 95% CI (7.58, 12.00)]. However, the difference in means was not statistically significant [*p* > .05]. There was homogeneity of variances for engagement scores for males and females behavior change, as assessed by Levene's test for equality of variances (*p* = .914). The bootstrap resampling baseline measure of ill-health avoidance was the same for equal variances assumed 95% CI [-2.69, 2.39] compared with equal variances not assumed 95% CI [-2.69, 2.39]. With equal variances assumed, the

independent samples *t* test with bootstrap resampling calculated [*MD* = -.22, *SED* = 1.28, 95% CI (-2.69, 2.39)].

Positive health. The overall baseline measure of positive health [*M* = 10.97, *SD* = 3.60, *SEM* =.81, *95% CI* (9.38, 12.45)]. The baseline measure of positive health was slightly higher for traditional college students [*M* = 11.85, *SD* = 3.20, *SEM* = .51, 95% CI (10.84, 12.81)] compared to non-traditional college students [*M* = 10.08, *SD* = 3.99, *SEM* = 1.11, 95% CI (7.91, 12.09)]. However, the difference in means was not statistically significant [*p* > .05]. There was homogeneity of variances for engagement scores for males and females for positive health, as assessed by Levene's test for equality of variances (*p* = .775). The bootstrap resampling baseline measure of positive health was the same for equal variances assumed, 95% CI [-.44, 4.25] compared with equal variances not assumed, 95% [CI -.44, 4.25]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* = 1.77, *SED* = 1.19, 95% CI (-.44, 4.25)].

Weight management. The overall baseline measure of weight management [*M* = 12.46, *SD* = 5.95, *SEM* =1.30, *95% CI* (9.84, 14.74)]. The baseline measure of weight management was slightly lower for traditional college students [*M* = 11.60, *SD* = 5.94, *SEM* = .94, 95% CI (9.82, 13.33)] compared to non-traditional college students [*M* = 13.31, *SD* = 5.96, *SEM* = 1.65, 95% CI (9.86, 16.14)]. However, the difference in means was not statistically significant [*p* > .05]. There was homogeneity of variances for engagement scores for males and females for weight management, as assessed by Levene's test for equality of variances (*p* = .443). The bootstrap resampling baseline measure of weightman was the same for equal variances assumed, 95% CI [-5.03, 2.22]

compared with equal variances not assumed, 95% CI [-5.03, 2.22]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* =-1.71, *SED* =1.84, 95% CI (-5.03, 2.22)].

Appearance. The overall baseline measure of appearance [*M* = 11.57, *SD* = 5.32, *SEM* =1.19, *95% CI* (9.27, 13.77)]. The baseline measure of appearance was slightly lower for traditional college students [*M* = 10.98, *SD* = 4.87, *SEM* = .77, 95% CI (9.53, 12.44)] compared to non-traditional college students [*M* = 12.15, *SD* = 5.76, *SEM* =1.60, 95% CI (9.00, 15.09)]. However, the difference in means was not statistically significant [$p > .05$]. There was homogeneity of variances for engagement scores for males and females for appearance, as assessed by Levene's test for equality of variances ($p = .520$). The bootstrap resampling baseline measure of appear was the same for equal variances assumed 95% CI [-4.31, 2.25] compared with equal variances not assumed 95% CI [-4.31, 2.25]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* =-1.18, *SED* =1.84, 95% CI (-4.31, 2.25)].

Strength and endurance. The overall baseline measure of strength and endurance [*M* =12.58, *SD* = 6.01, *SEM* =1.36, *95% CI* (9.92, 15.07)]. The baseline measure of strength and endurance was slightly higher for traditional college students [*M* = 14.23, *SD* = 5.14, *SEM* = .81, 95% CI (12.73, 15.81)] compared to non-traditional college students [*M* = 10.92, *SD* = 6.87, *SEM* = 1.91, 95% CI (7.11, 14.33)]. However, the difference in means was not statistically significant [$p > .05$]. The assumption of homogeneity of variances was violated, as assessed by Levene's test for equality of variances ($p = .173$). The bootstrap resampling baseline measure of strength and endurance was the same for equal variances assumed, 95% CI [-5.51, 7.44] compared

with equal variances not assumed, 95% CI [-5.51, 7.44]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* =-3.30, *SED* =2.00, 95% CI (-5.51, 7.44)].

Nimbleness. The overall baseline measure of nimbleness [*M* = 7.15, *SD* = 4.46, *SEM* =1.01, *95% CI* (5.25, 9.08)]. The baseline measure of nimbleness was slightly higher for traditional college students [*M* = 7.83, *SD* = 3.84, *SEM* = .61, 95% CI (6.70, 8.98)] compared to non-traditional college students [*M* = 6.46, *SD* = 5.08, *SEM* = 1.41, 95% CI (3.79, 9.18). However, the difference in means was not statistically significant [*p* > .05]. There was homogeneity of variances for engagement scores for males and females for nimbleness, as assessed by Levene's test for equality of variances (*p* = .093). The bootstrap resampling baseline measure of nimbleness was the same for equal variances assumed 95% CI [-1.43, 4.46] compared with equal variances not assumed 95% CI [-1.43, 4.46]. With equal variances assumed, the independent samples *t* test with bootstrap resampling calculated [*MD* =1.36, *SED* = 1.50, 95% CI (-1.43, 4.46)].

Table 9

Traditional and Non-traditional (t test)

Group statistics

	Traditional/Nontraditional		Statistic	Bias	Std. error	Bootstrap 95% confidence interval Lower	Upper
GLQ	Traditional	N	40				
		Mean	1.63	.00	.10	1.41	1.83
		Std. Deviation	.667	-.013	.065	.530	.774
		Std. Error Mean	.106				
	Nontraditional	N	13				
		Mean	2.15	.00	.19	1.78	2.53
		Std. Deviation	.669	-.037	.119	.437	.866
		Std. Error Mean	.191				
Process of change	Traditional	N	40				
		Mean	120.850	.0422	3.833	112.843	128.174
		Std. Deviation	24.669	-.548	3.212	17.679	30.308
		Std. Error Mean	3.900				
	Nontraditional	N	13				
		Mean	116.076	-.4391	11.481	92.626	137.369
		Std. Deviation	44.174	-2.676	7.214	26.648	55.254
		Std. Error Mean	12.251				
Stress management	Traditional	N	40				
		Mean	12.600	.0162	.875	10.730	14.199
		Std. Deviation	5.619	-.136	.604	4.249	6.631
		Std. Error Mean	.888				
	Nontraditional	N	13				
		Mean	10.153	-.058	2.007	6.250	14.059
		Std. Deviation	7.548	-.346	.876	5.101	8.769
		Std. Error Mean	2.093				

(table continues)

Group statistics

	Traditional/Nontraditional		Statistic	Bias	Std. error	Bootstrap 95% confidence interval Lower	Upper
Revitalization	Traditional	N	40				
		Mean	8.625	.011	.645	7.325	9.833
		Std. Deviation	4.142	-.066	.347	3.385	4.756
		Std. Error Mean	.655				
	Nontraditional	N	13				
		Mean	6.307	-.0178	1.376	3.555	9.110
		Std. Deviation	5.218	-.279	.741	3.412	6.363
		Std. Error Mean	1.447				
Enjoyment	Traditional	N	40				
		Mean	11.325	.023	1.036	9.215	13.228
		Std. Deviation	6.588	-.098	.483	5.526	7.417
		Std. Error Mean	1.041				
	Nontraditional	N	13				
		Mean	8.230	-.116	2.262	3.668	12.699
		Std. Deviation	8.535	-.456	1.0419	5.558	9.629
		Std. Error Mean	2.367				
Challenge	Traditional	N	40				
		Mean	9.850	.017	.809	8.307	11.473
		Std. Deviation	5.101	-.094	.521	3.941	6.043
		Std. Error Mean	.806				
	Nontraditional	N	13				
		Mean	8.846	-.134	2.196	4.400	12.916
		Std. Deviation	8.284	-.373	.833	6.006	9.303
		Std. Error Mean	2.297				

(table continues)

Group statistics

	Traditional/Nontraditional		Statistic	Bias	Std. error	Bootstrap 95% confidence interval Lower	Upper
Social recognition	Traditional	N	40				
		Mean	5.225	.029	.772	3.800	6.886
		Std. Deviation	4.979	-.067	.414	4.036	5.682
		Std. Error Mean	.787				
	Nontraditional	N	13				
		Mean	4.076	-.052	1.523	1.307	7.099
		Std. Deviation	5.751	-.375	1.159	2.398	7.070
		Std. Error Mean	1.595				
Affiliation	Traditional	N	40				
		Mean	4.100	-.003	.755	2.722	5.631
		Std. Deviation	4.727	-.093	.507	3.552	5.574
		Std. Error Mean	.747				
	Nontraditional	N	13				
		Mean	6.230	-.092	1.667	3.001	9.748
		Std. Deviation	6.233	-.375	1.022	3.811	7.772
		Std. Error Mean	1.728				
Competition	Traditional	N	40				
		Mean	5.950	.036	1.029	4.103	8.149
		Std. Deviation	6.404	-.113	.684	4.848	7.502
		Std. Error Mean	1.012				
	Nontraditional	N	13				
		Mean	4.538	-.130	1.839	1.154	8.199
		Std. Deviation	7.007	-.573	1.704	2.025	9.033
		Std. Error Mean	1.943				

(table continues)

Group statistics

	Traditional/Nontraditional		Statistic	Bias	Std. error	Bootstrap 95% confidence interval Lower	Upper
Health pressures	Traditional	N	40				
		Mean	3.725	-.018	.600	2.525	5.000
		Std. Deviation	3.796	-.111	.546	2.665	4.810
		Std. Error Mean	.600				
	Nontraditional	N	13				
		Mean	3.692	.009	.916	1.917	5.635
		Std. Deviation	3.351	-.203	.571	1.774	4.116
		Std. Error Mean	.929				
Ill-health avoidance	Traditional	N	40				
		Mean	9.700	.007	.610	8.486	10.920
		Std. Deviation	4.001	-.083	.410	3.144	4.706
		Std. Error Mean	.632				
	Nontraditional	N	13				
		Mean	9.923	.032	1.116	7.584	12.000
		Std. Deviation	4.251	-.298	.925	2.239	5.736
		Std. Error Mean	1.179				
Positive health	Traditional	N	40				
		Mean	11.850	.007	.495	10.842	12.804
		Std. Deviation	3.198	-.071	.381	2.338	3.823
		Std. Error Mean	.505				
	Nontraditional	N	13				
		Mean	10.076	.017	1.053	7.909	12.090
		Std. Deviation	3.988	-.388	1.031	1.871	5.632
		Std. Error Mean	1.106				

(table continues)

Group statistics

	Traditional/Nontraditional		Statistic	Bias	Std. error	Bootstrap 95% confidence interval Lower	Upper
Weight management	Traditional	N	40				
		Mean	11.600	.002	.928	9.823	13.333
		Std. Deviation	5.947	-.098	.417	4.986	6.639
		Std. Error Mean	.940				
	Nontraditional	N	13				
		Mean	13.307	-.021	1.571	9.8582	16.1424
		Std. Deviation	5.963	-.411	1.302	2.422	7.797
		Std. Error Mean	1.654				
Appearance	Traditional	N	40				
		Mean	10.975	.038	.765	9.525	12.435
		Std. Deviation	4.870	-.096	.451	3.853	5.650
		Std. Error Mean	.770				
	Nontraditional	N	13				
		Mean	12.153	-.019	1.505	9.000	15.090
		Std. Deviation	5.756	-.340	1.085	3.051	7.309
		Std. Error Mean	1.596				
Strength and endurance	Traditional	N	40				
		Mean	14.225	.0314	.784	12.725	15.805
		Std. Deviation	5.136	-.089	.539	3.989	6.064
		Std. Error Mean	.812				
	Nontraditional	N	13				
		Mean	10.923	-.095	1.837	7.101	14.333
		Std. Deviation	6.873	-.397	1.030	4.353	8.443
		Std. Error Mean	1.906				

(table continues)

Group statistics

						Bootstrap 95% confidence interval	
			Statistic	Bias	Std. error	Lower	Upper
Nimbleness	Traditional	N	40				
		Mean	7.825	.034	.603	6.700	8.976
		Std. Deviation	3.842	-.058	.378	3.050	4.491
		Std. Error Mean	.607				
	Nontraditional	N	13				
		Mean	6.461	-.032	1.358	3.786	9.181
		Std. Deviation	5.076	-.266	.709	3.361	6.154
		Std. Error Mean	1.407				

Table 10

Levene's Test for Equality of Variances (Traditional and Non-traditional)

Independent samples test

		Levene's test for equality of variances		*t* test for equality of means						
									95% confidence interval of the difference	
		F	Sig.	*t*	df	Sig. (2-tailed)	Mean difference	Std. error difference	Lower	Upper
GLQ	Equal variances assumed	.491	.487	-2.463	51	.017	-.529	.215	-.960	-.098
	Equal variances not assumed			-2.423	19.874	.025	-.529	.218	-.984	-.073
Processes of change	Equal variances assumed	6.283	.015	.492	51	.625	4.773	9.707	-14.715	24.261
	Equal variances not assumed			.371	14.510	.716	4.773	12.857	-22.713	32.259
Stress management	Equal variances assumed	4.112	.048	1.250	51	.217	2.446	1.956	-1.481	6.373
	Equal variances not assumed			1.076	16.548	.298	2.446	2.274	-2.362	7.254
Revitalization	Equal variances assumed	1.749	.192	1.642	51	.107	2.317	1.410	-.515	5.149
	Equal variances not assumed			1.459	17.198	.163	2.317	1.588	-1.031	5.666

(table continues)

Independent samples test

		Levene's test for equality of variances		*t* test for equality of means						
									95% confidence interval of the difference	
		F	Sig.	*t*	df	Sig. (2-tailed)	Mean difference	Std. error difference	Lower	Upper
Enjoyment	Equal variances assumed	3.845	.055	1.366	51	.178	3.094	2.265	-1.452	7.641
	Equal variances not assumed			1.196	16.902	.248	3.094	2.586	-2.365	8.553
Challenge	Equal variances assumed	11.550	.001	.524	51	.663	1.003	1.916	-2.844	4.852
	Equal variances not assumed			.412	15.070	.686	1.003	2.435	-4.184	6.192
Social recognition	Equal variances assumed	.216	.644	.695	51	.490	1.148	1.650	-2.166	4.462
	Equal variances not assumed			.645	18.226	.527	1.148	1.778	-2.585	4.881
Affiliation	Equal variances assumed	2.692	.107	-1.303	51	.198	-2.130	1.635	-5.413	1.151
	Equal variances not assumed			-1.131	16.725	.274	-2.130	1.883	-6.109	1.848
Competition	Equal variances assumed	.037	.849	.675	51	.503	1.411	2.091	-2.787	5.610
	Equal variances not assumed			.644	18.971	.527	1.411	2.191	-3.175	5.998

(table continues)

Independent samples test

		Levene's test for equality of variances		*t* test for equality of means						
									95% confidence interval of the difference	
		F	Sig.	*t*	df	Sig. (2-tailed)	Mean difference	Std. error difference	Lower	Upper
Health pressures	Equal variances assumed	.155	.696	.028	51	.978	.032	1.180	-2.336	2.401
	Equal variances not assumed			.030	22.871	.977	.032	1.106	-2.256	2.322
Ill-health avoidance	Equal variances assumed	.012	.914	-.172	51	.864	-.223	1.296	-2.826	2.380
	Equal variances not assumed			-.167	19.408	.869	-.223	1.338	-3.019	2.573
Positive health	Equal variances assumed	.083	.775	1.633	51	.109	1.773	1.085	-.406	3.953
	Equal variances not assumed			1.458	17.309	.163	1.773	1.216	-.789	4.336
Weight management	Equal variances assumed	.598	.443	-.899	51	.373	-1.707	1.900	-5.522	2.106
	Equal variances not assumed			-.898	20.358	.380	-1.707	1.902	-5.672	2.256
Appearance	Equal variances assumed	.420	.520	-.725	51	.472	-1.178	1.625	-4.442	2.085
	Equal variances not assumed			-.665	17.933	.514	-1.178	1.772	-4.904	2.546

(table continues)

Independent samples test

		Levene's test for equality of variances		*t* test for equality of means						
									95% confidence interval of the difference	
		F	Sig.	*t*	df	Sig. (2-tailed)	Mean difference	Std. error difference	Lower	Upper
Strength and endurance	Equal variances assumed	1.906	.173	1.849	51	.070	3.301	1.785	-.283	6.887
	Equal variances not assumed			1.593	16.583	.130	3.301	2.072	-1.078	7.682
Nimbleness	Equal variances assumed	2.931	.093	1.025	51	.310	1.363	1.329	-1.306	4.033
	Equal variances not assumed			.889	16.707	.387	1.363	1.533	-1.876	4.603

Table 11

Bootstrap for Independent Samples Test (Gender)

		Bootstrap for independent samples test					
						Bootstrap 95% confidence interval	
		Mean difference	Bias	Std. error	Sig. (2-tailed)	Lower	Upper
GLQ	Equal variances assumed	-.529	-.008	.214	.018	-.970	-.101
	Equal variances not assumed	-.529	-.008	.214	.020	-.970	-.101
Process of change	Equal variances assumed	4.773	.481	12.272	.700	-18.641	30.633
	Equal variances not assumed	4.773	.481	12.272	.702	-18.641	30.633
Stress management	Equal variances assumed	2.446	.075	2.210		-1.741	6.898
	Equal variances not assumed	2.446	.075	2.210		-1.741	6.898
Revitalization	Equal variances assumed	2.317	.029	1.545		-.666	5.340
	Equal variances not assumed	2.317	.029	1.545		-.666	5.340
Enjoyment	Equal variances assumed	3.094	.140	2.531	.234	-1.748	8.230
	Equal variances not assumed	3.094	.140	2.531	.249	-1.748	8.230

(table continues)

		Bootstrap for independent samples test					
						Bootstrap 95% confidence interval	
		Mean difference	Bias	Std. error	Sig. (2-tailed)	Lower	Upper
Challenge	Equal variances assumed	1.003	.152	2.367	.669	-3.615	5.832
	Equal variances not assumed	1.003	.152	2.367	.673	-3.615	5.832
Social recognition	Equal variances assumed	1.148	.081	1.723	.500	-2.223	4.448
	Equal variances not assumed	1.148	.081	1.723	.509	-2.223	4.448
Affiliation	Equal variances assumed	-2.130	.089	1.830		-5.841	1.414
	Equal variances not assumed	-2.130	.089	1.830		-5.841	1.414
Competition	Equal variances assumed	1.411	.167	2.127		-2.643	5.650
	Equal variances not assumed	1.411	.167	2.127		-2.643	5.650
Health pressures	Equal variances assumed	.032	-.028	1.089		-2.221	2.075
	Equal variances not assumed	.032	-.028	1.089		-2.221	2.075

(table continues)

Bootstrap for independent samples test

		Mean difference	Bias	Std. error	Sig. (2-tailed)	Bootstrap 95% confidence interval Lower	Upper
Ill-health avoidance	Equal variances assumed	-.223	-.024	1.278	.876	-2.688	2.390
	Equal variances not assumed	-.223	-.024	1.278	.878	-2.688	2.390
Positive health	Equal variances assumed	1.773	-.009	1.187	.154	-.443	4.254
	Equal variances not assumed	1.773	-.009	1.187	.182	-.443	4.254
Weight management	Equal variances assumed	-1.707	.023	1.836		-5.028	2.221
	Equal variances not assumed	-1.707	.023	1.836		-5.028	2.221
Appearance	Equal variances assumed	-1.178	.057	1.683		-4.306	2.248
	Equal variances not assumed	-1.178	.057	1.683		-4.306	2.248
Strength and endurance	Equal variances assumed	3.301	.127	1.998	.111	-.514	7.437
	Equal variances not assumed	3.301	.127	1.998	.130	-.514	7.437

(table continues)

Bootstrap for independent samples test

		Mean difference	Bias	Std. error	Sig. (2-tailed)	Bootstrap 95% confidence interval Lower	Upper
Nimbleness	Equal variances assumed	1.363	.066	1.497		-1.426	4.461
	Equal variances not assumed	1.363	.066	1.497		-1.426	4.461

Summary and Transition

This chapter contained a description of the data collection and analysis results. It included a summary of each of the research questions, data collection procedures, and findings of data analysis results. The purpose of this study was to examine current physical activity levels of college age students who have completed a college-level health education lecture course and laboratory to gain a better understanding of developing and improving interventions targeted at increasing physical activity behaviors among the college student population. The results of the three research questions show no statistical significance and therefore, we cannot reject the null hypothesis.

Although the data analysis of this study did not provide any statistical significance regarding the physical activity habits, physical activity determinants, and self-efficacy levels of college students, it did generate an abundance of new questions on what influences college students' motives and decisions to participate or not in physical activity. Chapter 5 discusses the interpretations of findings and limitations of the study, recommendations for future studies are also reviewed, and the chapter closes with implications for social change, and a concluding summary is presented.

Chapter 5: Conclusions, Recommendations, and Impact for Social Change

Introduction

The purpose of this study was to examine current physical activity levels of college age students who have completed a college-level health education lecture course and laboratory to gain a better understanding of developing and improving interventions targeted at improving physical activity behaviors. Determining the magnitude of the association between physical activity levels and the college age student population is an important initial step in developing appropriate interventions.

This study utilized a quantitative method through a self-administered questionnaire designed specifically to assess the differences in physical activity habits, physical activity determinants, and self-efficacy levels among male and female college students. A total of 70 undergraduate students took part in the study and were contacted via e-mail and asked to volunteer to participate in the study. The study looked to understand better how college students' physical activity habits, physical activity determinants, and self-efficacy levels influence their physical activity levels.

Interpretation of Findings

The findings of this study show no statistical significance with regard to the three research questions; however, the assumption of homogeneity of variances was violated, as assessed by Levene's test for equality of variances ($p < .05$) for appearance ($F(3,52) = 2.98$, $p = 0.04$) and nimbleness ($F(3,52) = 3.32$, $p = 0.03$) for the one-way ANOVA . These findings appear to corroborate the peer-reviewed literature from Chapter 2, which suggests course-based physical activity programs only have been found to be minimally

effective on long-term behavior change for increasing physical activity (Community Preventive Services Task Force, 2013; Boyle, et al., 2002).

Also, the results suggest no statistical significance regarding attitudes or behaviors about physical activity regardless of gender, class standing, or age, which correlates to research which implies insufficient evidence while having found to be only minimally effective (Community Preventive Services Task Force, 2013; Boyle, et al., 2002). The interpretation of findings of this research and their comparison with the literature review from Chapter 2 is discussed according to the three research questions, as follows.

Research Question 1.

RQ1: What are the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among male and female college students?

The data analysis for RQ1 showed baseline measures of male and female college students, evaluated using the Godin-Leisure-Time Exercise Questionnaire, Exercise Motivations Inventory – (EMI -2) and Process of Change (Questionnaire 4.1), not to be statistically significant at the .05 level of significance. As a result, data analysis results were not consistent when comparing with the literature regarding gender and physical activity reviewed in Chapter 2, which suggests college-aged men have reported being more physically active than women (Lightfoot & Blanchard, 2011; Brownson, Hoehner, Day, Forthsyth & Sallis, 2009; McArthur & Raedeke, 2009; Centers for Disease Control and Prevention, 2007). Additionally, research has shown that college age men participate more in both moderate and high-intensity physical activity compared to their female

counterparts (Sabourin & Irwin, 2008; Leslie et al., 1999; Douglas, Collins, & Warren, 1997).

Research Question 2.

RQ2: What are the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among class standing (freshmen, sophomore, junior, or senior) college students?

Data analysis for RQ 2 showed baseline measures among class standing (freshmen, sophomore, junior, or senior) college students not to be statistically significant at the .05 level of significance.

The transition from high school to college has been identified as a critical period for increasing physical activity levels and represents a major life adjustment for many college-aged students (World Health Organization, 2000; Bray & Kwan. 2006; Pennebaker et al., 1990). Data analysis showed statistically significant results for two subscales of the Exercise Motivations Inventory – (EMI -2), appearance and nimbleness. As a result, individual determinants may play a role in impacting a college student's physical activity participation while they transition into college life. Furthermore, the results are consistent with SCT, which asserts that behavior, personal factors, and environmental factors work to impact behavior outcomes (Boyle et al., 2011).

Research Question 3.

RQ3: What are the differences, if any, in physical activity habits, physical activity determinants, and self-efficacy levels among traditional college students vs. non-traditional college students?

The data analysis for research question 3 showed baseline measures among traditional and nontraditional college students not to be statistically significant at the .05 level of significance. As was presented in Chapter 2, various factors such as personal, social, environmental, and cognitive variables are believed to be associated with increases in physical activity levels. However, little if any research exists of the influences these variables have among the differences in physical activity levels when comparing traditional to nontraditional college students (Kulavic et. al, 2013).

Limitations

The following limitations of this study should be considered.

Study participants were limited to only college students attending a 4-year college in the upper Midwestern United States (both in a traditional and nontraditional setting). As a result, there may be limited generalizability for students who attend community college, colleges outside the United States, colleges with different admission and demographic profiles, or young adults who do not go to college (Pauline, 2013).

Because survey data were self-reported, student responses may have been prone to social desirability bias. According to Fisher (1993), the basic human tendency to present oneself in the best possible light can significantly alter information gained from self-reports.

Information may be inaccurate from those who had previously completed the college-level health education lecture course and laboratory due to completing both the course and laboratory at different stages of their academic careers. Therefore, estimating physical activity behavior can vary considerably and is dependent on the types of measures employed (Sarkin et al., 2000; Pauline, 2013).

Data analysis was performed on survey results of only 70 college age students who had previously completed a college-level health education lecture course and laboratory. Seventy was lower than the 264 identified to meet a valid multiple regression for achieving the criteria for the central limit theorem. According to Sarkin, et al. (2000) & Pauline, (2013), survey measures have shown only modest correspondence with objective measures of physical activity.

Finally, the study was unique in that each student was provided equivalent knowledge, skills, and abilities concerning the corequisite requirements necessary to meet the university's and the state's general requirement for having instruction focused specifically on personal health and well-being and initiating and continuing a physically active lifestyle.

Threats to Validity

The following are threats to internal and external validity.

Internal Validity

Internal validity refers to factors which can threaten internal validity of experiments including history, maturation, and selection of subjects (Hagstromer, Oja & Sjostrom, 2005; Welk, 2002; Campbell & Stanley, 1963). History plays a critical role in the outcome of this research, as students who participated may have completed the CoRequisite at different times during their academic carriers which could influence survey responses. Furthermore, changes in both class design and departmental budget availability have occurred since preexisting data was obtained and may change data measurement obtained from surveys.

Also, maturation should be considered. Subjects interest or expose to physical activity variables such as access to fitness facilities, exercise equipment or time management may have changed over the course of a semester or multiple semesters and various school years which could also impact survey results. Lastly, this study relied on a varied selection of study subjects who had completed the CoRequisite; although every effort was taken to eliminate selection bias of subjects by the researcher, selection bias must be taken into consideration to protect the integrity of the research findings.

External Validity

External validity is usually controlled by selecting study participants, treatments, experimental situations, and tests to represent some larger population (Thomas, Nelson, & Silverman, 2015). Although the selection of study participants and survey design were highly controlled, reactive or interactive effects of testing for this study must be taken into consideration as study participants might have altered or answered their survey answers incorrectly to indicate improved levels of physical activity compared to students who have not taken the CoRequisite. As a result of completing the CoRequisite, study participants have demonstrated their knowledge of a correlation existing between overall health and low levels of physical activity, which may in turn influence the data they provided on the surveys.

Recommendations

The most critical lesson to be learned from this study was a better understanding of the complexities associated with whether one chooses to engage in a lifestyle which is consistent with being physically active. One might think that one's activity level was based solely on motivation or more appropriately a lack of motivation to be active. While

either being motivated or not motivated remains a critical component of an active lifestyle, other factors such as time management and the transition from high school to college may play a role in a college students' desire to be active on a consistent basis.

Even though data analysis provided no statistical significance of current physical activity levels of college age students who have completed a college-level health education lecture course and laboratory. The college health education course and laboratory still show merit in providing college students with exposure to the benefits of pursuing a healthy lifestyle. Conversely, to make the college course more cost-effective and directed at improving students' behavior change toward physical activity, a more individualized approach, which incorporates time management, accessibility, and a personalized approach toward individualized health goals must be considered.

Finally, it is essential to continue to research the issues related to physical activity levels going beyond just being viewed as an individual problem. As previously stated, the literature is clear about a growing number of college students who do not meet the recommended requirements of an active lifestyle. However, aside from their motives, barriers or other variables which influence a person's decision to be active or not, if not addressed, will continue to impede the efforts of increasing physical activity participation among college students.

Implications for Social Change

While data analysis for this study provided no statistical significance, the findings are consistent with peer-reviewed literature from chapter 2, which suggests course-based physical activity programs only have been found to be minimally effective on long-term behavior change for increasing physical activity (Community Preventive Services Task

Force, 2013; Boyle, et al., 2002). In addition, this study and findings are important contributors to the literature as a few number of studies have assessed the efficiency and effectiveness of both course-based and supervised physical activity sessions in higher education have on physical activity behaviors (Buckworth, 2001; Wallace & Buckworth, 2009; Pinto, Cherico, Szymanski, & Marcus, 1998).

Furthermore, data analysis showed the assumption of homogeneity of variances was violated on two subscales for the Exercise Motivations Inventory – (EMI -2), as assessed by Levene's test for equality of variances ($p < .05$) for Appearance ($F(3,52) = 2.98$, $p = 0.04$) and Nimbleness ($F(3,52) = 3.32$, $p = 0.03$) for the One-way ANOVA. These results are consistent with SCT which asserts behavior, personal factors, and environmental factors work to impact behavior outcomes (Boyle et al., 2011). Higher education remains essential for impacting college students' physical activity behaviors while influencing social change. While the results provided no statistical significance, the data my offer useful to health educators, policy makers, and public health researchers in developing and implanting greater cost-effective measures into college health education courses and laboratories.

Conclusion

Despite the absence of statistical significance in this study the consequences of a sedentary lifestyle have been well documented, various national surveillance programs consistently indicate most adults (ages 18-64) in the United States do not meet the current recommendations for physical activity and only 20% of Americans participate in the recommended 150 minutes of strength and cardiovascular physical activity per week (Community Preventive Services Task Force, 2013; Oaklander 2016). Furthermore,

over half of the baby boomer generation, those born between 1946 and 1964, report doing no exercise at all, while over 80 million Americans over age six are entirely inactive (Oaklander 2016). As such, Healthy People 2020 lists physical activity as a leading health indicator for improving the health of all Americans (U.S. Department of Health and Human Services, 2013).

Consequently, declining levels of strength and cardiovascular physical activity levels are now being recognized more like a major global health problem while fast becoming one of the leading causes of mortality worldwide (Community Preventive Services Task Force, 2013; Oaklander 2016). Determining the magnitude and association between physical activity levels and the college age student population remains a critical step in developing appropriate interventions. With the continuing rising costs associated with health care and the skyrocketing costs associated with health insurance premiums, society as a whole should be promoting and encouraging healthy behaviors whenever and wherever we can. Investing in good health continues to play a pivotal role in this country's infrastructure by continuing to influence the growth and prosperity of our nation, now and in the future.

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Appendix A: Basic/Refresher Curriculum Completion Report

(Expires on 07/02/2017)

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI)

SOCIAL & BEHAVIORAL RESEARCH - BASIC/REFRESHER CURRICULUM COMPLETION REPORT

Printed on 07/27/2014

LEARNER	Jay Martin [redacted]
DEPARTMENT	[redacted]
PHONE	[redacted]
EMAIL	[redacted]
INSTITUTION	[redacted]
EXPIRATION DATE	07/10/2017

SOCIAL & BEHAVIORAL RESEARCH - BASIC/REFRESHER : Choose this group to satisfy CITI training requirements for Investigators and staff involved primarily in Social/Behavioral Research with human

COURSE/STAGE:	Basic Course/1
PASSED ON:	07/11/2014
REFERENCE ID:	13364211

REQUIRED MODULES	DATE COMPLETED	SCORE
Belmont Report and CITI Course Introduction	07/09/14	3/3 (100%)
History and Ethical Principles - SBE	07/10/14	4/5 (80%)
Defining Research with Human Subjects - SBE	07/10/14	5/5 (100%)
The Regulations - SBE	07/10/14	5/5 (100%)
Assessing Risk - SBE	07/10/14	5/5 (100%)
Informed Consent - SBE	07/10/14	4/5 (80%)
Privacy and Confidentiality - SBE	07/10/14	5/5 (100%)
Research with Prisoners - SBE	07/10/14	4/4 (100%)
Research with Children - SBE	07/10/14	4/4 (100%)
Research in Public Elementary and Secondary Schools - SBE	07/10/14	4/4 (100%)
International Research - SBE	07/10/14	3/3 (100%)
Internet Research - SBE	07/10/14	5/5 (100%)
Research and HIPAA Privacy Protections	07/10/14	4/5 (80%)
Conflicts of Interest in Research Involving Human Subjects	07/11/14	4/5 (80%)
Unanticipated Problems and Reporting Requirements in Social and Behavioral Research	07/11/14	1/3 (33%)

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI Program participating institution or be a paid Independent Learner. Falsified information and unauthorized use of the CITI Program course site is unethical, and may be considered research misconduct by your institution.

Paul Braunschweiger Ph.D.
Professor, University of Miami
Director Office of Research Education
CITI Program Course Coordinator

Appendix B: Physical Science Responsible Conduct of Research Curriculum

(Expires on 07/10/2017)

COLLABORATIVE INSTITUTIONAL TRAINING INITIATIVE (CITI)

PHYSICAL SCIENCE RESPONSIBLE CONDUCT OF RESEARCH CURRICULUM COMPLETION REPORT

Printed on 07/03/2014

LEARNER	Jay Martin [redacted]
DEPARTMENT	[redacted]
PHONE	
EMAIL	[redacted]
INSTITUTION	[redacted]
EXPIRATION DATE	07/03/2014

PHYSICAL SCIENCE RESPONSIBLE CONDUCT OF RESEARCH : This course is for investigators, staff and students with an interest or focus **Physical Science** research. This course contains text, embedded case studies AND

COURSE/STAGE:	RCR/1
PASSED ON:	07/03/2014
REFERENCE ID:	13364212

REQUIRED MODULES	DATE COMPLETED	SCORE
Responsible Conduct of Research (RCR) Course Introduction	06/30/14	No Quiz
Research Misconduct (RCR-Physical Sciences)	06/30/14	5/5 (100%)
Data Management (RCR-Physical Sciences)	06/30/14	5/5 (100%)
Authorship (RCR-Physical Sciences)	07/01/14	5/5 (100%)
Peer Review (RCR-Physical Sciences)	07/01/14	5/5 (100%)
Mentoring (RCR-In___terdisciplinary)	07/01/14	5/5 (100%)
Using Animal Subjects in Research (RCR-Interdisciplinary)	07/01/14	5/5 (100%)
Conflicts of Interest (RCR-Physical Sciences)	07/03/14	4/5 (80%)
Collaborative Research (RCR-Physical Sciences)	07/03/14	5/5 (100%)
Research Involving Human Subjects (RCR-Interdisciplinary)	07/03/14	5/5 (100%)
Responsible Conduct of Research (RCR) Course Conclusion	07/03/14	No Quiz

For this Completion Report to be valid, the learner listed above must be affiliated with a CITI Program participating institution or be a paid Independent Learner. Falsified information and unauthorized use of the CITI Progam course site is unethical, and may be considered research misconduct by your institution.

Paul Braunschweiger Ph.D.
Professor, University of Miam
Director Office of Research Education
CITI Program Course Coordinator

Appendix C: Godin Leisure-Time Exercise Questionnaire

Godin Leisure-Time Exercise Questionnaire

1. During a typical **7-Day period** (a week), how many times on the average do you do the following kinds of exercise for **more than 15 minutes** during your free time (write on each line the appropriate number).

	Times Per Week
a) **STRENUOUS EXERCISE** **(HEART BEATS RAPIDLY)** (e.g., running, jogging, hockey, football, soccer, squash, basketball, cross country skiing, judo, roller skating, vigorous swimming, vigorous long distance bicycling)	_____
b) **MODERATE EXERCISE** **(NOT EXHAUSTING)** (e.g., fast walking, baseball, tennis, easy bicycling, volleyball, badminton, easy swimming, alpine skiing, popular and folk dancing)	_____
c) **MILD EXERCISE** **(MINIMAL EFFORT)** (e.g., yoga, archery, fishing from river bank, bowling, horseshoes, golf, snow-mobiling, easy walking)	_____

2. During a typical **7-Day period** (a week), in your leisure time, how often do you engage in any regular activity **long enough to work up a sweat** (heart beats rapidly)?

OFTEN	SOMETIMES	NEVER/RARELY
1. ☐	2. ☐	3. ☐

Appendix D: The Exercise Motivation Inventory – 2 (EMI-2)

The Exercise Motivations Inventory - 2 (EMI-2)

On the following pages are a number of statements concerning the reasons people often give when asked why they exercise. *Whether you currently exercise regularly or not,* please read each statement carefully and indicate, by circling the appropriate number, whether or not each statement *is true* for you personally, *or would be true* for you personally if you did exercise. If you do not consider a statement to be true for you at all, circle the '0'. If you think that a statement is very true for you, circle the '5'. If you think that a statement is partly true for you, then circle the '1', '2', '3' or '4', according to how strongly you feel that it reflects why you exercise or might exercise.

Remember, we want to know why *you personally* choose to exercise or might choose to exercise, not whether you think the statements are good reasons for *anybody* to exercise.

It helps us to have basic personal information about those who complete this questionnaire. We would be grateful for the following information:

Your age ………… years **Your gender …… male/female**

Personally, I exercise (or might exercise) …	Not at all true for me					Very true for me
1 To stay slim	0	1	2	3	4	5
2 To avoid ill-health	0	1	2	3	4	5
3 Because it makes me feel good	0	1	2	3	4	5
4 To help me look younger	0	1	2	3	4	5
5 To show my worth to others	0	1	2	3	4	5
6 To give me space to think	0	1	2	3	4	5

Personally, I exercise (or might exercise) …	Not at all true for me					Very true for me
40 Because I enjoy physical competition	0	1	2	3	4	5
41 To stay/become flexible	0	1	2	3	4	5
42 To develop personal skills	0	1	2	3	4	5
43 Because exercise helps me to burn calories	0	1	2	3	4	5
44 To look more attractive	0	1	2	3	4	5
45 To accomplish things that others are incapable of	0	1	2	3	4	5
46 To release tension	0	1	2	3	4	5
47 To develop my muscles	0	1	2	3	4	5
48 Because I feel at my best when exercising	0	1	2	3	4	5
49 To make new friends	0	1	2	3	4	5
50 Because I find physical activities fun, especially when competition is involved	0	1	2	3	4	5
51 To measure myself against personal standards	0	1	2	3	4	5

Thank you for completing this questionnaire

D. Markland PhD, C.Psychol
University of Wales, Bangor
Email: d.a.markland@bangor.ac.uk
January 1997

Appendix E: The Exercise Motivation Inventory – 2 (EMI-2)

	Personally, I exercise (or might exercise) …	Not at all true for me					Very true for me
7	To have a healthy body	0	1	2	3	4	5
8	To build up my strength	0	1	2	3	4	5
9	Because I enjoy the feeling of exerting myself	0	1	2	3	4	5
10	To spend time with friends	0	1	2	3	4	5
11	Because my doctor advised me to exercise	0	1	2	3	4	5
12	Because I like trying to win in physical activities	0	1	2	3	4	5
13	To stay/become more agile	0	1	2	3	4	5
14	To give me goals to work towards	0	1	2	3	4	5
15	To lose weight	0	1	2	3	4	5
16	To prevent health problems	0	1	2	3	4	5
17	Because I find exercise invigorating	0	1	2	3	4	5
18	To have a good body	0	1	2	3	4	5
19	To compare my abilities with other peoples'	0	1	2	3	4	5
20	Because it helps to reduce tension	0	1	2	3	4	5
21	Because I want to maintain good health	0	1	2	3	4	5
22	To increase my endurance	0	1	2	3	4	5
23	Because I find exercising satisfying in and of itself	0	1	2	3	4	5

	Personally, I exercise (or might exercise) …	Not at all true for me					Very true for me
24	To enjoy the social aspects of exercising	0	1	2	3	4	5
25	To help prevent an illness that runs in my family	0	1	2	3	4	5
26	Because I enjoy competing	0	1	2	3	4	5
27	To maintain flexibility	0	1	2	3	4	5
28	To give me personal challenges to face	0	1	2	3	4	5
29	To help control my weight	0	1	2	3	4	5
30	To avoid heart disease	0	1	2	3	4	5
31	To recharge my batteries	0	1	2	3	4	5
32	To improve my appearance	0	1	2	3	4	5
33	To gain recognition for my accomplishments	0	1	2	3	4	5
34	To help manage stress	0	1	2	3	4	5
35	To feel more healthy	0	1	2	3	4	5
36	To get stronger	0	1	2	3	4	5
37	For enjoyment of the experience of exercising	0	1	2	3	4	5
38	To have fun being active with other people	0	1	2	3	4	5
39	To help recover from an illness/injury	0	1	2	3	4	5

Please Turn Over

Appendix F: Processes of Change (Questionnaire 4.1)

QUESTIONNAIRE 4.1 Processes of Change

Physical activity or exercise includes activities such as walking briskly, jogging, bicycling, swimming, and any other activity in which the exertion is at least as intense as these activities.

The following experiences can affect the exercise habits of some people. Think of any similar behaviors you may currently have or have had during the **past month.** Then rate how frequently the behavior occurs. Please circle the number that best describes your answer for each experience.

How frequently does this occur?

1 = never
2 = seldom
3 = occasionally
4 = often
5 = repeatedly

1.	Instead of remaining inactive, I engage in some physical activity.	1 2 3 4 5
2.	I tell myself I am able to be physically active if I want to.	1 2 3 4 5
3.	I put things around my home to remind me to be physically active.	1 2 3 4 5
4.	I tell myself that if I try hard enough, I can be physically active.	1 2 3 4 5
5.	I recall information people have personally given me on the benefits of physical activity.	1 2 3 4 5
6.	I make commitments to be physically active.	1 2 3 4 5
7.	I reward myself when I am physically active.	1 2 3 4 5
8.	I think about information from articles and advertisements on how to make physical activity a regular part of my life.	1 2 3 4 5
9.	I keep things around my place of work that remind me to be physically active.	1 2 3 4 5
10.	I find society changing in ways that make it easier to be physically active.	1 2 3 4 5
11.	Warnings about the health hazards of inactivity affect me emotionally.	1 2 3 4 5
12.	Dramatic portrayals of the evils of inactivity affect me emotionally.	1 2 3 4 5
13.	I react emotionally to warnings about an inactive lifestyle.	1 2 3 4 5
14.	I worry that inactivity can be harmful to my body.	1 2 3 4 5
15.	I am considering the idea that regular physical activity would make me a healthier, happier person to be around.	1 2 3 4 5
16.	I have someone I can depend on when I am having problems with physical activity.	1 2 3 4 5
17.	I read articles about physical activity in an attempt to learn more about it.	1 2 3 4 5
18.	I try to set realistic physical activity goals for myself rather than set myself up for failure by expecting too much.	1 2 3 4 5

(continued) ▷

Appendix G: Processes of Change (Questionnaire 4.1)

QUESTIONNAIRE 4. 1 *(continued)*

19.	I have a healthy friend who encourages me to be physically active when I don't feel up to it.	1 2 3 4 5
20.	When I am physically active, I tell myself that I am being good to myself by taking care of my body.	1 2 3 4 5
21.	The time I spend being physically active is my special time to relax and recover from the day's worries, not a task to get out of the way.	1 2 3 4 5
22.	I am aware of more and more people encouraging me to be physically active these days.	1 2 3 4 5
23.	I do something nice for myself for making efforts to be more physically active.	1 2 3 4 5
24.	I have someone who points out my rationalizations for not being physically active.	1 2 3 4 5
25.	I have someone who provides feedback about my physical activity.	1 2 3 4 5
26.	I remove things that contribute to my inactivity.	1 2 3 4 5
27.	I am the only one responsible for my health, and only I can decide whether or not I will be physically active.	1 2 3 4 5
28.	I look for information related to physical activity.	1 2 3 4 5
29.	I avoid spending long periods of time in environments that promote inactivity.	1 2 3 4 5
30.	I feel that I would be a better role model for others if I were regularly physically active.	1 2 3 4 5
31.	I think about the type of person I would be if I were physically active.	1 2 3 4 5
32.	I notice that more businesses are encouraging their employees to be physically active by offering fitness courses and time off to work out.	1 2 3 4 5
33.	I wonder how my inactivity affects those people who are close to me.	1 2 3 4 5
34.	I realize that I might be able to influence others to be healthier if I would be more physically active.	1 2 3 4 5
35.	I get frustrated with myself when I am not physically active.	1 2 3 4 5
36.	I am aware that many health clubs now provide babysitting services to their members.	1 2 3 4 5
37.	Some of my close friends might be more physically active if I were.	1 2 3 4 5
38.	I consider the fact that I would feel more confident in myself if I were regularly physically active.	1 2 3 4 5
39.	When I feel tired, I make myself be physically active anyway because I know I will feel better afterward.	1 2 3 4 5
40.	When I'm feeling tense, I find physical activity a great way to relieve my worries.	1 2 3 4 5

From B. Marcus and L. Forsyth, 2009, *Motivating people to be physically active*, 2nd ed. (Champaign, IL: Human Kinetics). Reprinted, by permission, from B.H. Marcus et al., 1992, "The stages and processes of exercise adoption and maintenance in a worksite sample," *Health Psychology* 11: 386-395.

Appendix H: Godin Leisure-Time Exercise Questionnaire Permission Letter

Founded in 1954

AMERICAN COLLEGE of SPORTS MEDICINE®

Mission Statement: The American College of Sports Medicine advances and integrates scientific research to provide educational and practical applications of exercise science and sports medicine.

May 26, 2016

Mr., Jay Martin
[redacted]

Dr. Mr. Martin

This letter grants permission for you to utilize the Godin Leisure-Time Questionnaire published in the June 1997 supplement from *Medicine & Science in Sports & Exercise* in your project.

Our only requirement is that you cite/attribute the content from *Medicine & Science in Sports & Exercise.*

Please let me know if you need more information.

Sincerely Ð

Katie Feltman
Director of Publishing
40 1 W. Michigan Street
Indianapolis, IN 46202
Telephone: (317) 352-3803
www. acsm. org

Appendix I: Exercise Motivation Inventory – 2 (EMI-2) Open Source Notice

Exercise Motivation Measurement

David Markland PhD C.Psychol

School of Sport, Health & Exercise Sciences
Bangor University

Welcome to my exercise motivation measurement website. Over a number of years we have developed and validated or adapted several instruments for measuring aspects of motivation from the perspective of Deci and Ryan's (1985) self-determination theory (SDT). These pages give information on the instruments and the facility to download them. You are welcome to use any of these measures in your own research.

The *Behavioural Regulation in Exercise Questionnaire* (BREQ) measures different forms of motivation for exercise based on Deci and Ryan's (1985, 1991) continuum conception of extrinsic and intrinsic motivation.

The *Exercise Motivations Inventory-2* (EMI-2) is a measure of participation motives or reasons for exercising. The *Exercise Motives and Gains Inventory* (EMGI) is a recent development that complements the EMI-2 to provide scales assessing perceived gains from exercise that correspond to the EMI-2 scales.

The *Perceived Environmental Supportiveness Scale* measures perceptions of the extent to which exercise professionals provide individuals with support for their psychological needs (i.e., autonomy support, structure and involvement).

The *Exercise Causality Orientations Scale* (ECOS) measures individual differences in the tendency to be autonomous, controlled or amotivated in exercise contexts and is derived from Deci and Ryan's Causality Orientations Theory.

The *Locus of Causality for Exercise Scale* is a short measure of the degree to which individuals feel self-determined with respect to exercise.

Finally, although it is derived from a different theoretical perspective than SDT, we include here a measure of task and ego goal orientations for exercise contexts, the *Goal Orientations in Exercise Measure*.

The instruments are available for downloading as either .pdf files or MS Word documents.

On obtaining permission to use the scales

This is simple. If you are using the scales for research purposes you do not have to ask for permission! You are free to use the scales, adapt them, translate them or do whatever you like with them, provided, of course, that any publications that ensue include appropriate citations to their source. Students are also free to use the scales for projects, assignments and so on without having to ask for permisssion. If you translate any of the scales into other language versions I would be pleased upload them to this site for others to use. If you want to do this, please send me the translated scales, scoring information and any relevant references

David Markland PhD C.Psychol
School of Sport Health & Exercise Sciences
Bangor University
George Building, Holyhead Road,
Bangor, Gwynedd, U.K. LL57 2PZ.
Tel: (44) (0) 1248 382756 E-mail: d.a.markland@bangor.ac.uk

Author: David Markland | Updated: Friday, October 24, 2014 12:27

Appendix J: Processes of Change (Questionnaire 4.1) Permission Letter

May 25, 2016

Jay Martin
[redacted]

RE: Request for permission to reprint Questionnaire 4.1, "Processes of Change" on pages 169-170 of *Motivating People to Be Physically Active, Second Edition,* by B.H. Marcus and L.H. Forsyth, in your doctoral dissertation [ID #12134]

Dear Mr. Martin:

Thank you for your interest in material published by Human Kinetics.

We are pleased to approve your permission request for one-time use of Questionnaire 4.1, "Processes of Change" on pages 169-170 of *Motivating People to Be Physically Active, Second Edition,* in your doctoral dissertation at Black Hillls State University/Walden University. This is your confirmation that we are granting nonexclusive print and electronic rights, for worldwide distribution, contingent upon your use of the following credit line adjacent to the reprinted material.

CREDIT LINE:

Reprinted, with permission, from B.H. Marcus and L.H. Forsyth, 2009, *Motivating people to be physically active,* 2nd ed. (Champaign, IL: Human Kinetics), 169-170.

FEE: WAIVED

In the future, should you wish to formally publish this material, please request permission again.

Sincerely,

Martha Gullo

Martha Gullo
Permissions
Coordinator
Ph: 217-351-
5076 ext. 2223
Email:
marthag@hkus
a.com