

**EFFECTS OF MOTIVATIONAL CHANGE: TWO MANDATORY PHYSICAL
ACTIVITY-BASED WELLNESS PROGRAMS AT A SOUTH TEXAS HISPANIC
SERVING INSTITUTION**

A Dissertation

by

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ABSTRACT

Physical inactivity is one of the leading risk factors for chronic diseases and illness. Unfortunately, physical activity (PA) participation drops as individuals age with the largest decline between the ages of 18 to 21, which is traditional college age. Therefore, the purpose of this dissertation is to examine change of motivation to PA participation and adherence for college students enrolled in a two pedagogically different PA based mandatory wellness program in a South Texas four-year Hispanic Serving Institution. This dissertation is a preliminary version. Future publications will include revisions and will be different from this dissertation submission.

This dissertation is broken into three primary sections. Chapter II is a review of current literature. The studies in Chapter II focus on outcomes for college students enrolled in a require PA course. Findings of these studies include 1) a steady drop in required PA college courses, 2) theoretical frameworks primarily focus on college student's stage of behavior, with only a few utilizing motivation and long-term adherence to PA, 3) very little PA literature focus on racial/ethnic minorities, and 4) only a couple studies focus on the effectiveness of pedagogical delivery methods in required PA courses.

Chapter III evaluated possible changes to motivation for college students enrolled in a required PA course. The Behavior Regulation to Exercise Questionnaire 2 survey is designed to measure the Organismic Integration Theory's motivational subscales (e.g. amotivation, extrinsic regulation, introjected regulation, identified regulation,

and intrinsic regulation). Data were analyzed from 383 college students enrolled in the required PA course. Findings of Chapter III suggest that college-students participating in a required PA course may experience positive motivational changes to PA participation and adherence.

Finally, Chapter IV examines possible changes to college students' PA motivation in a flipped pedagogical design within a required PA course. A total of 152 college students' responses to the BREQ-2 survey were assessed. The flipped course used in Chapter IV only reflected minimal changes across the OIT motivational subscales to PA. The results suggest that a flipped delivery method may not be an effective pedagogical approach to maximizing PA motivational changes among college students.

DEDICATION

I dedicate this dissertation to my husband, William Brandon Weston, and my two wonderful boys, Elijah James Barton and Isaiah Marcus Weston. I cannot express how truly thankful I am for their patience and understanding of all the struggles, their supportive and constant reminder to what the struggle is truly for, and their love and encouragement while at home and on the road throughout this entire journey. Without their support, I would have never made it this far.

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Contributors

These studies were supervised by a dissertation committee consisting of Professor Lei-Shih (Lace) Chen [advisor and chair], Professor Susan Ward of the Department of Health and Kinesiology, Professor Kelly Wilson of the Department of Health and Kinesiology, and Professor Mary Alfred of the Department of Educational Administration and Human Resource Development.

Assistance with editing Chapter 3 and Chapter 4 was provided by Professor Lei-Shih (Lace) Chen. The analyses in Chapter 4 was reviewed in part by Shixi Zhao of the Department of Health and Kinesiology.

All other work conducted for the dissertation was completed by the student independently.

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1. INTRODUCTION

The participation and adherence of physical activity (PA) has been found to help reduce the risk of obesity, cardiovascular disease, high blood pressure, ischemic stroke, type 2 diabetes, colorectal and breast cancers (National Center for Chronic Disease Prevention and Health Promotion [NCCDPHP], 2004; Physical Activity Guidelines Advisory Committee [PAGAC], 2008). Although these benefits have been well documented, Center of Disease Control and Prevention (CDC) contributes 70% of U.S. deaths and disability to physical inactivity (CDC, 2012). This equates to roughly 1.7 million deaths each year and 25 million individuals suffering from daily living limitations that decrease their quality of life (CDC, 2012). In fact, Healthy Campus 2020 has identified inactivity as one of three risk factors related to more than 50% of preventable deaths (2016).

To reduce the diagnosis of diseases related to inactivity, college students are now considered an important population to focus on for preventative initiatives (Valero-Elizondo, Salami, Osondu, Ogunmoroti, Arrieta, Spatz, Nasir, 2016). There are three primary reasons that public health practitioners suggest that college-based PA education curriculum may be a final opportunity to foster PA participation and adherence (Woekel, Ebbeck, Concepcion, Readdy, Li, Lee, & Cardinal, 2013). First, the percentage of 18- to 24-year-olds enrolling in college is steadily rising from 35.5% in 2000 to 41.0% in 2016 (National Center of Education Statistics, 2016). In fall 2016, roughly 20.5 million students are were expected to attend an American college and/or university (U.S.

Department of Education [USDE], National Center for Education Statistics [NCES], n.d.). Second, studies show the time between 18 to 25 years of age are associated with exploration, change, and long-term lifestyle choices (Nelson, Story, Larson, Neumark-Sztainer, Lytle, 2008). This suggests that undergraduate college students are at a critical point in adopting lifelong PA and health behaviors (Keating et al., 2005).

Lastly, there is a critical decline of PA rates during the transition period from high school (adolescents) to college (young adults) (Pauline, 2013; Bray & Born, 2004). Researchers report that roughly 65% of high school students participate in vigorous PA and another 27% of high school students participating in moderate PA (Magoc et al, 2016; Rovniak, Eileen, & Winett, 2002; USDHHS, 2015). In contrast, only 32% of young adults (18- to 24-year-olds) participate in vigorous PA and an additional 17% engages in moderate PA (Magoc et al, 2016; Rovniak et.al, 2002; USDHHS, 2015). The dramatic decline between high school and college is consist with the fact that about only 43.9% of college students report meeting the daily PA recommendations for healthy individuals between the ages of 18 to 65 (Keating et al., 2005 & American College Health Association, 2016). Unfortunately, only 10 to 17% of four-year universities require students to take a PA course as a graduation criterion (Henry, Klein, Kempland, Oswald, & Rexilius, 2017). Thus, potentially missing a unique opportunity to change long-term PA participation and adherence among a large adult population. There is a vast amount of studies that evaluate the effectiveness of elective based PA college courses (Melnyk, Kelly, Jacobson, Arcoleo, and Shaibi, 2014; Buckworth & Nigg 2004). Typically, these studies include college students who voluntarily registering for the elective PA course. These college students

may represent a sample that is either currently participating, starting to participate, or strongly motivated to engage in PA. Unfortunately, these studies may not capture outcomes related to college students that are less likely to register for an elective PA course and maybe currently inactive. There are a limited number of studies that focus on effects a required college based PA course has on student participation and adherence (Keating, Guan, Piñero, Bridges, 2005).

Current studies focusing on the effects of college-based PA courses support positive short-term behavior changes but have resulted in minimal long-term benefits that affect quality of life (Keating et al., 2005). These outcomes may be explained by findings that show individuals do not always act upon their intended behaviors (Schwarzar, 2008). Thus, suggesting theoretical frameworks associated with intended behaviors may not effectively ensure positive long-term behavior changes. Instead, PA courses should use theoretical framework that is designed to enhance long-term PA participation and adherence. Motivation has been found to be a significant contributor to an individual's likelihood of long-term PA participation and adherence (Quartioli, 2014; Bauman, Reis, Sallis, Wells, Loos, Martin, 2012; Duncan, Hall, Wilson, Jenny, 2010; Biddle & Nigg, 2000).

There are very little studies that focus on the effects required PA courses have on college students' motivation to PA participation and adherence. Additionally, to the best of our knowledge there are no studies that focus on the effects a flipped pedagogical design in required PA course have on college students' motivation to PA participation and adherence. Therefore, the purpose of this dissertation is to examine change of

motivation to PA participation and adherence for college students enrolled in a two pedagogically different mandatory PA based wellness program in a South Texas four-year Hispanic Serving Institution.

This dissertation examined and addressed these questions in two studies. The first study examined motivation changes to PA for college students enrolled in a required PA and wellness course (intervention #1). Study two examined motivation changes to PA for college students registered in required PA and wellness course that utilizes a flipped pedagogical design. In study two, the flipped design is defined as students reviewing course material prior to attending class and using in-class time for experiential activities and PA (intervention #2).

These two studies are significant because 1) outcomes will represent motivational changes for college students that are currently physically active and likely to register for an elective PA course, and more importantly college students who are inactive and less likely to participate in elective PA courses, 2) the results will help determine if a flipped pedagogical delivery method in a required PA course can have a positive impact to college students' motivation to PA participation and adherence, and 3) findings will impact college students currently enrolled in a South Texas Hispanic Serving institution which has a high population of first-generation Hispanic students, which is a underrepresented population in the literature.

The dissertation consists of five chapters. Chapter III and Chapter IV are manuscripts that will be submitted to peer-reviewed journals for publication. The following is a description of the five chapters:

- Chapter I is an introduction to the topic that includes a brief description of the significance of the topic, purpose of the studies, and the importance of the research project.
- Chapter II discusses the current literature of PA interventions within a college setting. This chapter focuses on literature documenting outcomes related to “required” PA courses in a college setting with a specific focus on motivational changes to determine the effectiveness of the theoretical approach used within interventions.
- Chapter III discusses the quantitative results of motivational changes among college students registered in a required PA and wellness course. The study (intervention #1) reports outcomes that use a face-to-face pedagogical delivery format (traditional delivery). This chapter is the first manuscript.
- Chapter IV presents the quantitative results for college students’ motivational changes to PA participation and adherence when content is delivered in a flipped classroom format. All reported results are related to students registered in a required PA and wellness course. This chapter is the second journal manuscript.
- Chapter V presents the conclusions reached after reviewing the results of Chapters III & IV, possible implications for health education and promotion programs and future research recommendations.

2. LITERATURE REVIEW OF MANDATORY PHYSICAL ACTIVITY COURSE EFFECTS ON COLLEGE STUDENTS' PARTICIPATION TO PHYSICAL ACTIVITY

Physical activity (PA) has an extensive impact on the health of individuals in the United States. Participation in regular PA contributes to many health benefits including reducing the risk of obesity, cardiovascular diseases, high blood pressure, ischemic stroke, type 2 diabetes, colorectal and breast cancers (National Center for Chronic Disease Prevention and Health Promotion [NCCDPHP], 2004; Physical Activity Guidelines Advisory Committee [PAGAC], 2008). Additionally, participation in regular PA also decreases symptoms associated with anxiety and depression, physician visits, medication use, and hospitalization (Pratt, Marcera, Wang, 2000; National Center for Chronic Disease Prevention and Health Promotion [NCCDPHP], 2004; Physical Activity Guidelines Advisory Committee [PAGAC], 2008; Washington, DC: U.S. Department of Health and Human Services [DHHS], 2008).

Conversely, inadequate levels of PA are associated with a significant increase in both preventable health problems and financial costs, which unnecessarily burden of the United States (U.S.) health care system (Carlson, Fulton, Pratt, Yang, Adams, 2015; Center of Disease Control [CDC], 2012). In the U.S., 70% of deaths and disability are contributed to physical inactivity (CDC, 2012). This equates to roughly 1.7 million deaths each year and 25 million individuals suffering from daily living limitations that decrease their quality of life (CDC, 2012). These numbers have a confounding effect on the economic costs associated with health care. From 2006 to 2011, health care cost hit a

staggering \$1.05 trillion with an estimated \$131 billion (11.1%) attributed to inadequate PA levels (Carlson et al., 2015). Studies have consistently shown that obese individuals have higher health care expenditures than individuals that are within their recommended body weight. The costs associated with inactivity and obesity account for roughly 9.4 cents of every dollar spent on health care (Bell, Zimmerman, Arterburn, Maciejewski, 2010; Anderson, Martinson, Crain, Pronk, Whitebird, Fine, 2005; Finkelstein, Trogdon, Cohen, Dietz, 2009; Brown, Hockey, Dobson, 2008; Finkelstein et al., 2009). On the other hand, physically active Americans have an annual health care expenditure savings of 26.6% up to 50% in comparison to inactive individuals, leading to an overall annual savings of billions in medical costs (Valero-Elizondo et al., 2016; Carlson, Fulton, Pratt, Yang, Adams, 2015).

While there are health benefits and medical cost savings related to leading an active lifestyle, roughly half of U.S. adults do not meet the Surgeon General's physical activity recommendations. Recommended guidelines for aerobic PA are broken down by both daily and weekly activity levels. Guidelines for aerobic PA state that an individual should participate in an accumulation of 30 minutes of moderate-to-vigorous activity most days of the week. This translates into the weekly recommendations of a minimum of 150 accumulate minutes of moderate-intensity or 75 accumulate minutes of vigorous-intensity PA (Carlson et. al., 2015; Schiller, Lucas, & Peregoy, 2012.) Even worst, one-third of U.S. adults are completely inactive (Carlson et al., 2015; U.S. Department of Health and Human Services [USDHHS], 2008; Washington DC U.S. Department of Health and Human Services [WDHHS], 2008).

With the documented health benefits of regular PA, increasing participation and adherence to PA is now a primary public health initiative (Magoc, Tomaka, Shamaley, & Bridges, 2016; Bautista, Reininger, Gay, Barroso, & McCormick, 2011; Ickes & Sharma, 2012; Petosa, Suminski, & Hertz, 2003). Global and national health authorities have identified PA as one of the most important participatory behaviors to improving prevention health and treatment of disease (Pauline, 2013; National Physical Activity Plan, 2001). Organizations such as the World Health Organization (W.H.O.), Center of Diseases Control (C.D.C.), U.S. Department of Health and Human Services' (U.S.D.H.H.S) Office of Diseases Prevention and Health Promotion (O.D.P.H.P), and the American College Health Association (A.C.H.A.) are just a few of health agencies actively engaged on increase population health through PA participation and adherence.

2.1. PA Behaviors of U.S. College Students

To divert the ongoing rise in both diseases and medical cost related to inactivity, prevention initiatives such as ACHA's Healthy Campus 2020 have identified college students as an important population (Valero-Elizondo et al., 2016). One reason is that studies show the time between 18 to 25 years of age are associated with exploration, change, and long-term lifestyle choices (Nelson, Story, Larson, Neumark-Sztainer, Lytle, 2008). This suggests that undergraduate college students are at a critical point in adopting lifelong PA and health behaviors (Keating et al., 2005). Additionally, colleges are considered an ideal setting for PA interventions because of the potentially large number of participants. The percentage of 18- to 24-year-olds enrolling in college is steadily rising from 35.5% in 2000 to 40.0% in 2014 (National Center of Education

Statistics, 2016). Roughly 20.5 million students are expected to attend an American college and/or university during the fall 2016 semester (U.S. Department of Education [USDE], National Center for Education Statistics [NCES], n.d.).

Even though strategies for promoting PA have become an important preventative public health initiative within higher educational settings (Plotnikoff, Costigan, Williams, Hutchesson, Kennedy, Robards, Allen, Collins, Callister, and Germov, 2015), studies still show that in 2015 only 43.9% of college students reported meeting the daily PA recommendations (males=49%, females=41.6%) (American College Health Association, 2016). Moreover, 29% of incoming freshman self-report being physically inactive (Racette, Deusinger, Strube, Highstein, & Deusinger, 2005). Among college freshman students that do report being active, 7% will report discontinuing participation in PA before the end of their sophomore year (Racette et al., 2005).

Due to the number of students enrolled and the formative time for students to adopt behaviors, public health researchers suggest that college-level PA education curriculum may be a final opportunity to foster PA adherence (Woekel et al., 2013). Studies show that roughly 85% of college seniors that report being physically active will continue to be active for up to a minimum of 10 years after graduation (Keating et al., 2005). On the other hand, 81% of seniors that report not engaging in physical activity would maintain a sedentary lifestyle after graduating (Keating et al., 2005). Unfortunately, only 10 to 17% of four-year universities require students to take a PA course as a graduation criterion (Henry, Klein, Kempland, Oswald, & Rexilius, 2017).

Thus, health educators within universities are potentially missing a unique opportunity to change long-term PA participation and adherence among a large adult population.

2.2. Current Required College-Based PA Interventions

There is a vast number of studies that evaluate the effectiveness of college-based PA courses (Melnyk et. al, 2004). Studies that focus on PA courses have measured factors associated with a wide range of student behaviors including self-efficacy, attitude, exercise identity, participation perception, intention, and self-determination to exercise participation. However, the majority of PA course research focuses solely on outcomes of students that participate voluntarily. In other words, these studies do not use courses that are a curriculum requirement for student graduation but instead typically are considered elective courses (Keating et al., 2005). Students that voluntarily register for these PA courses may already represent a group that is either currently or starting to participate in PA or has strong motivations for PA. The studies that utilize voluntary registration into elective PA courses do not capture the entire student population, specifically students that could be inactive. An extensive search through ProQuest, EBSCOhost, SAGE journals, Google Scholar, PubMed, and ERIC, identified only eight published studies that evaluate outcomes related to graduation required PA courses within a college-aged population. Keywords used to identify the eight peer-review articles between 2008 to 2017 include graduation requirement, physical activity course, required physical activity, college-based, motivation, wellness, lecture and lab, physical activity curriculum, physical activity delivery, and physical activity pedagogy.

Study 1: Required PA effect on Student Attitude

Although this study did not utilize a traditional PA course, Esslinger, Grimes, and Pyle (2016) measured the effects that required PA participation has on student attitude toward PA. This experimental pilot study utilized students that were enrolled in a graduation required health and wellness course that did not include a required PA component. Esslinger et al. (2016) split the course offerings into two groups, the control which only took the required health and wellness course and the experimental group which included the course and a required PA component. The experimental group was required to sign in and participate in independent PA for a minimum of two days a week inside the institution's wellness center. The study found that after completing the semester long course, there were no significant differences found between the two groups' attitude toward PA (Esslinger, Grimes, & Pyle, 2016). This suggests courses that require a PA component do not have negative effects on student attitude toward PA (Esslinger et al., 2016), but instead could yield overall positive health benefits for those students that maintained an active lifestyle for the duration of the course.

Study 2: Required PA Course effect on Self-Efficacy and Perceived Wellness

In a second study evaluating a required PA course, Sidman, D'Abundo, and Hritz conducted a large quantitative evaluation to determine the effects that PA self-efficacy has on student overall perceived wellness. The study collected 611 survey responses from students that completed the semester long course; it is important to note the demographics for this study did consist of primarily Caucasian females (44%) that were either sophomores or juniors. The results did prove that an increase in student PA self-efficacy

did have a positive effect on the student's perceived wellness. Even more interesting is this study found that students had higher PA self-efficacy scores not from participating in PA but instead by the student's ability to adhere to PA for longer than six months (Sidman, D'Abundo, and Hritz, 2009). This suggests that a student's ability to adhere to a long-term regular PA routine can have positive psychological benefits for the students. The fact that student self-efficacy is positively affected by maintaining a PA routine implies that course outcomes should be focused on increasing the long-term PA adherence.

Study 3: Required PA Course effect on Minority Females Motivation

Since there is very little research related to PA motivation focusing on minority female college students, Hassel, Milroy, and Orsini evaluated the effect a required physical education and wellness course had on student PA motivation (2015). By using the Self Determination Theory (SDT), Hassel et al. (2015) evaluated the motivation regulation changes among African American women enrolled in the course. Out of 1,400 invited students, only 54 responding students in this study identified being non-Caucasian, which did not provide enough data to support the study's hypothesis that external motives can predict participation and adherence to exercise in minority populations. However, the study recommended that participating in the required basic health course provided minority students that may otherwise be unmotivated to participate in exercise, the opportunity to engage in ongoing regular PA (Hassel et al., 2015). Furthermore, this study's inability to gain conclusive results highlights the ongoing need for additional research that focuses specifically on minority populations.

Study 4: Required PA Course effect on PA, Nutrition, and Self Perception

Acknowledging the critical point that undergraduate college students are at in adopting lifelong PA and health behaviors (Keating et al., 2005), Woekel, Ebbeck, Concepcion, Readdy, Li, and Cardinal conducted a very small-scale qualitative study to determine how a required Fitness and Health course would affect student PA and nutritional behaviors as well as student self-perception to PA (2013). After the completion of the ten-week required course, a total of twenty students participated in small focus group interviews. Findings from this study showed that students self-reported engaging in healthy behaviors related to PA and nutritional intake. This suggests that by participating in a required PA course, students can make decisions that enhance healthy behaviors related to PA and nutrition. However, the study also found that students did not self-report an increase in their perceived changes. Woekel et al. suggest the lack of student self-perception to behavior change may be due to the lack of student reflection time within course design (Woekel et al., 2013). Of the studies found that evaluated a required PA course, this is the first study that suggests that course design may have an impact on student outcome.

Study 5: Course Delivery Effects on PA Behaviors

Everhart and Dimon (2013) set out to determine if different course delivery methods would affect student behaviors related to PA and nutrition. Everhart and Dimon surveyed 103 students enrolled in a required PA course to measure possible changes in PA and nutritional behaviors based on courses that were delivered in either traditional (face-to-face), online, or blended (combination of traditional and online). This study found that

regardless of the delivery method, the course had a positive effect on the students' participation in PA specifically related to muscular strength (Everhart et al., 2013). However, students enrolled on either traditional or blended delivery formats reported participating in significantly higher rates of weekly cardiovascular PA (Everhart et al., 2013). Lastly, regardless of delivery method, all students reported making beneficial changes to their nutritional intake after completing the course (Everhart et al., 2013). Although results for online specific courses did not prove as promising for aerobic PA, the findings support that courses offered with both online and traditional components (blended) do have positive outcomes related to aerobic and anaerobic PA participation. Since all three delivery methods reflect positive outcomes related to nutritional behaviors, there may be additional factors to consider (i.e. social interactions) that may be affecting the lack of success online students have in increasing participation in aerobic-based PA.

Study 6: Course Delivery Effects on PA Motivation

In 2009, Sidman, Fiala, and D'Abundo measured changes in motivation among college-aged students enrolled in a PA and wellness course. The course used three different delivery formats which included traditional, online, and blended. Blended was defined as either the face-to-face class with PA completed independently (reported online) or as an online course with students meeting face-to-face (lab) to complete PA together. Sidman et al. used the Behavioral Regulation Questionnaire (BREQ-2) to measure students' shift among the five motivational regulators. After analyzing the 101 student voluntary responses, no difference in motivational regulations was found across the different course formats (Sidman et al., 2011). This outcome suggests that students

enrolled in online PA courses or courses with an online component can still have positive outcomes in motivation to PA participation and adherence.

Study 7: Course Delivery Effects on Perceived Wellness

Milroy, Orsini, D'Abundo, and Sidman (2013) evaluated the effects that a PA course had on student perceived wellness. This study utilized three different delivery formats including traditional, online, and hybrid (combination of face to face and online). Milroy et al. collected 659 student responses to the Perceived Wellness Survey. Results of this study found that students enrolled in the online course had higher scores in total perceived wellness. This study found that students in online and hybrid courses scored higher in perceived self -image, self-regard, and overall wellness. However, there was no difference found among course delivery methods and physical wellness. These results suggest that online or hybrid courses provide students with positive psychological results. These results further support that regardless of the delivery format, student overall perceived physical wellness can be positively impacted.

Study 8: Course Delivery Effects on PA Knowledge

In 2014, Sidman, D'Abundo, and Bullard sought out to determine knowledge changes among three delivery approaches (traditional, online, and blended). Although SDT was not the primary theoretical framework of the intervention, Sidman et al. utilized course content that highlighted constructs related to SDT such as intrinsic motivation, self-efficacy, self-determination, social support, goal setting, and overcoming barriers. Overall results of this study found that delivery format did not have a significant difference in the measurable constructs (Sidman et al., 2014). However, the study did find that students

with online lecture and face-to-face lab (blended delivery) had significantly higher scores in constructs related to “lifelong adherence” to participating in PA (Sidman et al., 2014). This outcome supports the previous finding that students enrolled in face-to-face lecture courses score lower within constructs related to PA participation and adherence (Sidman et al., 2014).

2.2.1. Summary of Literature

The eight studies identified in this review evaluated outcomes related to a college-based required PA course. Four of the eight studies measured changes in behavior, attitude, and knowledge for college students enrolled in a required PA course (Esslinger, Grimes, & Pyle, 2016; Hassel, Milroy, & Orsini, 2015; Woekel, Ebbeck, Concepcion, Readdy, Li, & Cardinal, 2013; & Sidman, D’Adundo, & Hritz, 2009). The additional four studies measured differences related to pedagogical delivery methods in a required PA course (Everhart & Dimon, 2013; Sidman, Fiala, & D’Abundo, 2009; Milroy, Orsini, D’Abundo, & Sidman, 2013; Sidman, D’Abundo, & Bullard, 2014). Although there were no significant differences found across different pedagogical delivery methods, seven of the eight studies did report positive outcomes for college students enrolled in a required PA course. The findings of these studies support similar outcomes for college students who voluntarily enroll in either an elective based PA course which would include content lecture or an exercise only (no content lecture) PA course (Wilson, Rodgers, Fraser, & Murray, 2004; Egli, Bland, Melton, & Czech, 2011).

Each of the eight studies measured outcomes associated with students enrolled in a required PA course, which is the primary strength for each study. The outcomes reflect

students that do and do not currently participate in PA, which is pertinent information for developing programs that enhance motivation among young adults. Based on the results of the studies the following conclusion and/or discussion arise:

- 1) Colleges provide an excellent opportunity to implement PA programs that has access to a specific target population;
- 2) Although the evidence reflects the ongoing need for increasing PA interventions, many institutions are decreasing student offerings and are not including PA as part of the core curriculum of graduations requirements;
- 3) PA interventions have proven to effectively increase short-term positive outcomes;
- 4) Theories utilized have primarily focused on the participant's current stage of behavior (Transtheoretical Model of Change, [TTM]), and very few have taken into consideration constructs associated with motivations and long-term adherence to the behavior (SDT);
- 5) The majority of the studies participants were mainly Caucasian; only study 3 focused on racial/ethnic minorities (i.e., African American students);
- 6) There are limited studies that focus specifically on the effectiveness of delivery methods related to required curriculum-based PA courses (Everhart et al., 2013; Sidman et al., 2011; & Keating et al., 2005). The studies that focused on delivery methods (studies 5, 6, 7, and 8) only include three primary delivery methods; traditional face to face, completely online, and blended which was defined as some course material was online (either content or PA reporting)

and some was face to face (either content or PA participation). None of the studies utilized current pedagogical methods such as service learning, experiential learning, or flipped delivery. This supports Keating et al. (2005) call for additional evaluations of pedagogical approaches that determine if program delivery methods will have an effect on student adherence to life-long PA; and

- 7) This review could not identify any study that evaluated a PA course that utilized a flipped course delivery method. A flipped classroom is a pedagogical method that reverse the traditional in class instructional format to an individual out of class learning, leaving the in-class time to be used as innovative group interactions and activities (Abeysekera & Dawson, 2015). A flipped course provides students the opportunity to view course content outside of class, typically online, and reallocates the class time to implement experiential and practical application-based activities with feedback (Findlay-Thompson & Mombourquette, 2014). Advancements in technology have provided an effective platform to deliver pre-recorded lectures covering the essential content for students to review prior to attending and participating in experience-based activities during the class meeting time (Gerstein, 2011; Milman, 2012). The flipped course designs have been identified as an effective instructional strategy (Tucker, 2012) that allows the content to be delivered outside of the classroom and still maintain face to face in class time to further enhance knowledge and understanding of the content through real life skill-

based activities. This model has been described by both students and instructors to be engaging through greater emphasis on the relationships and interactions within the classroom setting (Stone, 2012). Flipped course design literature suggests that research is needed to clarify the use of this design method and its effect on increasing both student learning and attitudes toward courses (Stone, 2012).

2.3. Theoretical Frameworks for the PA Course Used in these Dissertation Studies

Even though researchers have found positive short-term behavior change outcomes associated with PA interventions, the long-term outcomes are not as promising (Keating et al., 2005). Studies have shown that individuals do not always act upon their intended behaviors (Schwarzar, 2008). This suggests that theoretical frameworks associated with intended behavior change may not be effective in ensuring long-term results. Theories related to long-term adherence of behavior change should be a consideration as a primary framework for PA interventions. One factor that contributes significantly to long-term participation and adherence of PA is an individual's motivation (Quartioli, 2014; Bauman et al., 2012; Duncan et al., 2010; & Biddle & Nigg, 2000).

2.3.1. Self-Determination Theory: Increasing Student Motivation to PA

Self-Determination Theory (SDT) has been utilized to explore and explain the motivational factors that influence an individual's level of PA engagement and adherence (Quartioli, 2014; Ullrich-French, Smith, & Cox, 2011; Daley, 2006). This multidimensional theoretical framework of motivation is useful in explaining what leads to PA participation and long-term adherence (Ryan & Deci, 2000; Deci & Ryan, 2008;

Teixeira, Carraça, Markland, Silva, & Ryan, 2012; Quartiroli, 2014; Friederichs, Bolman, Oenema, & Lechner, 2015). SDT identifies three psychological needs that foster motivational long-term participation and adherence in PA: competence, autonomy, and relatedness (Deci & Ryan, 2000; González-Cutre & Sicilia, 2012). In relation to PA, competence refers to feeling effective and achieving goals and/or objectives, autonomy promotes participation in activities of personal interest, and relatedness is the need to maintain positive relationships with peers and instructors that foster acceptance into a welcoming environment (González-Cutre & Sicilia, 2012). Deci and Ryan (2000) found that satisfying these psychological needs has a positive effect on internalization and intrinsic motivation.

Self Determination Theory states that there are different motivational types that influence an individual's long-term adherence to PA (Teixeira, Silva, Mata, Palmeira, & Markland 2012). Intrinsic motivation, extrinsic motivation, and amotivation are the three primary motivational types that SDT states influence an individuals' aspirations or motives (Deci & Ryan, 1985; Kasser & Ryan, 1996). These three primary types of motivation foster tendencies of growth, mastery, and integration to new experiences that provide a greater sense of self. (Deci & Ryan, 2000). Intrinsically motivated individuals engage in activities for their own personal satisfaction and pleasure (Deci, Vallerand, Pelletier, & Ryan, 1991). An intrinsically motivated person participates in the activity freely with no need for external rewards or recognition. Studies support that intrinsically motivated behaviors have higher positive consequences (i.e. PA participation and adherence) (Deci & Ryan, 2000; Vallerand, 2001). In opposition, amotivation reflects an

individual's complete lack of interest or desire to participate in the behavior. Research has shown that amotivation is related to the discontinuation of a behavior because of the lack of psychological needs (autonomy, competence, relatedness) being met (Ryan & Deci, 2000; & Wilson, Rodgers, Fraser, & Murray, 2004). Finally, an externally motivated individual's participation is influenced by external rewards or environmental factors (Deci et al., 1991). Since individuals that are extrinsically motivated are not participating based on interest but instead by environmental reinforcements, they tend to have lower rates of long-term adherence in relations to their participation (Deci et al., 1991).

One main concept of SDT is that external motivation is multidimensional based on the individual's level of needs that have been met. Organismic Integration Theory (OIT), a sub-theory to SDT, categorizes this multi-dimensional approach through a continuum of regulation constructs associated with extrinsic motivation (external, introjected, identified, and integrated,) that lead to internal motivation for PA participation (Deci et al., 1991; Deci & Ryan, 1985; Deci & Ryan, 2000; & Deci & Ryan, 2008; Wilson, Rodgers, Fraser, & Murray, 2004). In the OIT continuum (Figure 2.1), amotivation and intrinsic regulation represent complete opposite ends. Intrinsic regulation is no different from intrinsic motivation, which results in the same outcomes as being intrinsically motivated (Ünlü, 2016; Wilson et al., 2004). Between amotivation and intrinsic regulation, are the external regulators that identify the regulation stages from becoming amotivational to intrinsically motivated (or vice versa). Extrinsic regulation, the most direct form of external motivation, drives participation in a behavior

for the primary purpose of obtaining some form of external reward. Introjected Regulation, the next regulatory continuum construct, describes an individual's participation in a behavior that has not been accepted as his or her own but instead is to avoid negative feelings (i.e., guilt or anxiety). Identification Regulation, the lowest form of autonomous participation, is a more self-driven behavior and is described as valuing a personal goal and/or benefit associated with the behavior. Finally, Integration Regulation, still considered a form of extrinsic motivation, is the process in which an individual participates in a behavior based on self-needs, enjoyment, and "identified regulations have been fully assimilated to the self" (Ryan & Deci, 2000, p.62).

As previously stated, the OIT continuum (Figure 2.1) reflects an individual's transitional process among the motivational regulators in relation to the participation and adherence to PA (Ryan & Deci, 2000; Markland & Tobin, 2004; Ünlü, 2016). Although positive behavioral consequences (i.e. PA participation and adherence) have been found to be associated with intrinsic motivation, initiation to an exercise behavior is more likely not associated with intrinsic regulators (Deci & Ryan, 2000; Wilson et al., 2004). Based on the individual's feeling of autonomy, competence, and relatedness to the exercise, a shift along the regulators in the continuum becoming more self-determined would result in positive behavioral consequences associated with identified regulation and more so with integrated regulation (González-Cutre & Sicilia 2012; Vallerand, 2012; Deci & Ryan, 2000).

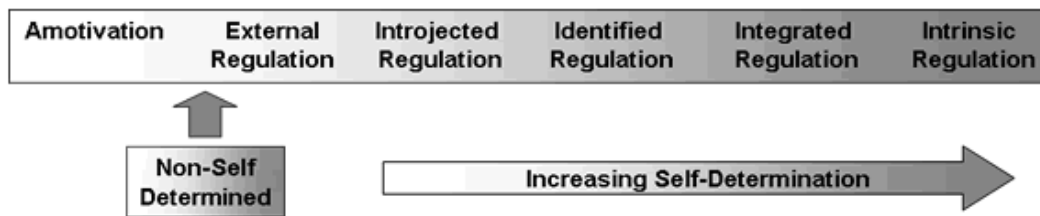


Figure 2.1 Self-determination and the regulation of behaviour: A taxonomy of regulatory styles (Reprinted with permission from Markland, 2014)

An individual's motivation to PA is an important factor that will affect their participation and adherence (Quartioli, 2014; Biddle & Nigg, 2000). Previous studies have found that college-aged students are primarily externally motivated (e.g. look good, weight loss, or complements) to participate in PA (Pauline, 2013; Leslie, Owen, Salmon, Bauman, Sallis, & Lo, 1999; Lowry, Galuska, Fulton, Weshsler, Kann, & Collins, 2000). Since the initiation of exercise is more likely not associated with intrinsic regulators, college-aged participants are more likely to be willing to initiate participation to exercise behavior (Deci & Ryan, 2000; Wilson et al., 2004).

Self-Determination recognizes that external motivation is multidimensional based on the spectrum of how self-determined an individual is (Markland & Tobin, 2004). Based on the OIT continuum (Figure 2.1), college-aged participants' can transition through the external motivational regulators if their individual feelings of autonomy, competence, and relatedness are met (González-Cutre & Sicilia 2012; Vallerand, 2012; Deci & Ryan, 2000). College-aged participants that become more self-determined would have positive long-term participation and adherence outcomes associated with identified regulation and more so with integrated regulation (González-Cutre & Sicilia 2012; Vallerand, 2012; Deci & Ryan, 2000). Based on the theoretical approach, college students could effectively

initiate and increase the likelihood of adhering to PA if their initial motivation shifts from external to internal.

2.3.2. Experiential Learning Theory

Experiential learning is a method that allows students to apply their knowledge and understanding to real-world problems. The real-life situations are grounded on a structured cycle of doing and reflecting to cause greater meaning and improve application (Wurdinger & Carlson, 2010; Gerstein, 2011; Beard & Wilson, 2013; Young & Hundley 2013). Through this process of implementing experiential learning activities, the role of the instructor shifts from delivering content to facilitating learning. Interestingly, by allowing young adults to have some autonomy or control over their learning, it helps to facilitate their own motivation to learn (Zigmont Kappus, & Sudikoff, 2011). Benefits of this approach include providing students with real-world experiences, raising motivation for learning, improving problem-solving skills, higher self-efficacy, competence, and relatedness (Beard & Wilson, 2013; Crossman, 2016).

Kolb's Experiential Learning Cycle (Figure 2.2) consists of four stages. Concrete experience, which is a simulation that allows learners to identify knowledge gaps. Reflective observation is a debriefing that allows participants to reflect on the activity and their performance. Abstract conceptualization allows participants to conceptualize the skill in future real-world experiences. Finally, active experimentation which allows the participants to implement or simulate the skill in a real-world situation. Kolb suggests that each stage within the Learning Cycle is equally important to learning regardless of which stage within the cycle the subject begins (Kolb, Boyatzis, & Mainemelis, 2000; McLeod,

2013). This suggests that through the theoretical model of the Experiential Learning Cycle, participation flexibility would not have a direct effect on the participant's ability to learn the content or skill.

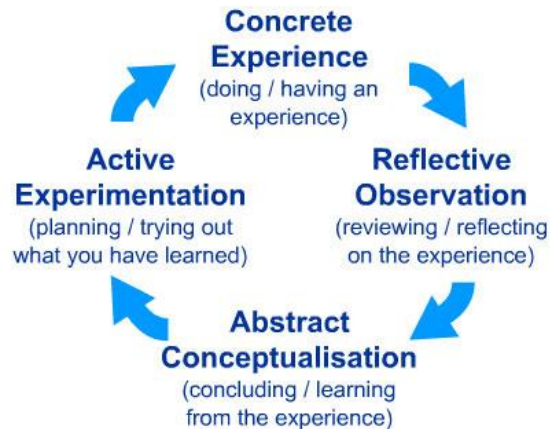


Figure 2.2 Kolb's Experiential Learning Cycle (Reprint from McLeod, 2013)

2.4. Summary

Life time habits are formed during an individual's collegiate experience (Keating et al., 2005), institutions should include a PA core curriculum graduation requirement that focuses on long-term adherence (Magnotta, Grant, Driscoll, Mead, Petrova, Edison, Hassell, Soukup, Munoz, Cuccia, Payne, Jenkins, Terhaar, Ballard, Kim, Overbeek, & Shields, 2009). This means that PA courses should use be designed to focus on increasing student needs that will enhance the likelihood of engaging in long-term PA (Keating, Guan, Pinero, & Bridges, 2005). Since SDT identifies individual motivation types to PA participation and adherence, courses should incorporate methods that increase the students psychological (i.e., autonomy, relatedness, and competence) needs

that will foster the student's intrinsic motivation to PA (Teixeira, Carraça, Markland, Silva, & Ryan, 2012).

It is important to recognize that delivery formats focusing only on knowledge do not have short or long-term improvements in transferring the information to practice (Zigmont et al., 2011). This suggests that course delivery formats need to be considered as part of the initial course design that effectively increases student PA participation and adherence. Course designs that used both online and face-to-face (blended) delivery methods have had some promising scores related to constructs associated with “lifelong adherence” to participating in PA (Sidman et. al., 2014). This outcome may be related to the flexibility of the design to incorporate the student opportunities to participate in real world experiences. Implementation of these activities into a course designs have been found to have positive psychological outcomes such competence, relatedness, increase the autonomy and an overall increased to student motivation (Beard & Wilson, 2013; Crossman, 2016; Zigmont et al., 2011).

3. MOTIVATION EFFECTS OF A MANDATORY PHYSICAL ACTIVITY-BASED WELLNESS PROGRAM AMONG COLLEGE STUDENTS

There are physiological and psychological benefits associated with adhering to a physically active lifestyle (Centers for Disease Control and Prevention (CDC), 2018). Individuals that adhere to a physical activity (PA) benefit from decreased risk, morbidity, and mortality of many diseases (e.g., heart diseases, diabetes, high blood pressure, cancers, depression, and anxiety) (Magoc, Tomaka, Shamaley, & Bridges, 2016; Pauline, 2013; CDC, 2015; Keating, Guan, Pinero, & Bridges, 2005). In addition to those benefits, other health advantages related to the participation of PA include, positive well-being, enhanced vigor, better cognitive function, and the increases in metabolism, immune function, and mental health (Magoc et al., 2016; Pauline, 2013; CDC, 2015; Keating et al., 2005).

The American College Health Association's (ACHA) Healthy Campus 2020 has identified college campuses as an ideal environment to implement initiatives focusing on increasing PA participation and adherence (Valero-Elizondo et al., 2016; Magoc et al., 2016; Petosa, Suminski, & Hertz, 2003). There are three main reasons. The first reason is because of the potentially large number of participants. The percentage of 18- to 24-year-olds enrolling in college is steadily rising from 35.5% in 2000 to 40.0% in 2014 (National Center of Education Statistics, 2016). Roughly 20.5 million students are expected to attend a United States (U.S.) university during the fall 2016 semester (U.S. Department of Education [USDE], National Center for Education Statistics [NCES],

2016). Another reason is that studies have showed young adults between the ages of 18 and 24-year-olds are at a critical point in adopting lifelong PA and health behaviors that can impact the rest of their lives (Zhang, Xiang, Gu, & Rose, 2016; Keating et al., 2005).

The last reason is the critical decline of PA rates occurring during the transition period from high school (adolescents) to college (young adults) (Pauline, 2013; Bray & Born, 2004). Researchers report that roughly 65% of high school students participate in vigorous PA and another 27% of high school students participating in moderate PA (Magoc et al, 2016; Rovniak, Eileen, & Winett, 2002; USDHHS, 2015). In contrast, only 32% of young adults (18- to 24-year-olds) participate in vigorous PA and an additional 17% engages in moderate PA (Magoc et al, 2016; Rovniak et.al, 2002; USDHHS, 2015). The dramatic decline between high school and college is consist with the fact that about half of incoming college students' report PA levels below the recommendations made by the American College of Sport Medicine (ACSM) and American Heart Association (AHA) for healthy individuals between the ages of 18 to 65 (Keating et al., 2005).

Due to the above reasons, public health researchers now suggest college-level PA education curricula may be the final opportunity to foster PA adherence among young adults (Woekel et al., 2013). Unfortunately, there are only a handful studies that focus on the effectiveness of required PA courses in a college setting (Sidman et al., 2014; Milroy, Orsini, D'Abundo, & Sidman, 2013; Everhart & Dimon, 2013; Sidman et al., 2011; Woekel et al., 2013; Hassel et al., 2015; Sidman et al., 2009; Esslinger et al., 2016). The participants in those studies were primarily Caucasian students. To address the limited research in this area and expanded the sample to students belonging to racial

monitories, the purpose of this study is to measure the effectiveness a required PA course has on college students' PA participation in a Hispanic Serving Institution. Based on the review of recent studies, it is hypothesized that college students enrolled in the required PA course will experience positive change related to PA participation. The institution's demographics consisted of students between the ages of 18-24, a large female Hispanic population, and typically first-generation students.

3.1. Method

3.1.1. A Required PA Course

This study obtained permissions from the Institutional Review Boards of University of the Incarnate Word and Texas A&M University. Dimensions of Wellness (DWHP 1200) was a required core PA course for freshman students at University of the Incarnate Word, a South Texas Hispanic Serving Institute. The course was designed based on the Self-Determination Theory (SDT) to increase student motivation to PA participation and adherence. The SDT identifies three motivations: intrinsic motivation (i.e., engaging in PA activities for personal pleasure), extrinsic motivation (i.e., environmental reinforcements for PA activities), and amotivation (i.e., lack of interest in PA activities) (Deci et al., 1991; & Ryan & Deci, 2000). Based on the sub-theory to SDT, Organismic Integration Theory (OIT), intrinsic and extrinsic motivations were associated with introjected, and identified regulations. Introjected regulation is described as an individual participating in a PA that is not accepting as their own (simply because that the PA course is required) (Ryan & Deci, 2000). Identified regulation is defined as

valuing a personal goal, which was included in the assignment of the PA course (Ryan & Deci, 2000).

DWHP 1200 was offered in multiple sections. While taught by various instructors, all sections of the course had identical syllabi. All instructors were trained by the first author of this manuscript who was the Coordinator of Wellness to ensure the curriculum was delivered in the same way. Moreover, about 10% of the classes taught by each instructor was randomly selected for observation to confirm the consistency of the course delivery. The duration of DWHP was fifteen weeks which meet twice a week for seventy-five minutes each. Each meeting consisted of a content lecture section (forty-five minutes) in the beginning and later in-class group aerobic physical activity (thirty minutes). In-class lectures focused on health issues, healthy behaviors, PA recommendations, and nutrition and stress management related to PA. The group aerobic physical activity session was hold at the university's outdoor track. During the first two weeks, 1.5-mile fitness assessments were conducted. Instructors also provided students with running activity instructions (e.g., distance, time, and run patterns) and ran with students together. During the further eleven weeks, instructors and students participated in different types of group aerobic PA modalities (e.g. kickboxing, cycling, and circuit training). At the end of the two weeks of the course, each student completed the other 1.5-mile fitness assessments.

3.1.2. Data collection

All students were invited to participate in an evaluation of the course's effect on motivation to PA on the first day the course and informed consent forms were collected.

Paper-and-pencil surveys were distributed and collected on both first week (baseline and pre-test) and sixteenth week (post-test) of the course. Students were instructed on how to complete the surveys and were encouraged to answer the survey questions truthfully and independently. Assurances were given that all responses were confidential, participating instructors had no access to students' data, and participation and the responses in the surveys would not affect their course grades. Data were collected from spring semester (January – May) of 2010 through fall semester (August – December) of 2012. Data were not collected during spring 2011 due to delayed Internal Review Board renewal process as well as during summer course due to shortened class duration (8 weeks versus 15 weeks). A total of 80 sections of DWHP 1200 Dimensions of Wellness were offered during this period, and of which 21 sections were selected using simple random sampling for the purpose of the evaluation. Each section had 24-28 student enrollments.

3.1.3. Instrument

The Behavioral Regulation to Exercise Questionnaire 2, developed and validated by Markland & Tobin (2004) measures an individual's perceived motivation to exercise participation ranging from non-autonomous (controlled) to autonomous (self-determined). The 19-item instrument scores the five OIT continuum motivation subscales (Table 3.1). (Biddle & Nigg, 2000). Using a five-point Likert scale range from "not at all true for me" to "very true to me" survey questions have respondents identify and/or classify reasons associated with PA participation behaviors. (Markland & Tobin, 2004).

Table 3.1 BREQ-2 Motivational Sub-Scales with Corresponding Survey Questions

Measured Variable	Survey Number	Corresponding Question
Amotivation	5	I don't see why I should have to exercise
	9	I can't see why I should bother exercising
	12	I don't see the point in exercising
	19	I think exercising is a waste of time
Extrinsic Motivation	1	I exercise because other people say I should
	6	I take part in exercise because my friends/family/partner say I should
	11	I exercise because others will not be pleased with me if I don't
	16	I feel under pressure from my friends/family to exercise
Introjected Regulation	2	I feel guilty when I don't exercise
	7	I feel ashamed when I miss an exercise session
	13	I feel like a failure when I haven't exercised in a while
Identified Regulation	3	I value the benefits of exercise
	8	It's important to me to exercise regularly
	14	I think it is important to make the effort to exercise regularly
	17	I get restless if I don't exercise regularly
Intrinsic Motivation	4	I exercise because it's fun
	10	I enjoy my exercise sessions
	15	I find exercise a pleasurable activity
	18	I get pleasure and satisfaction from participating in exercise

Among a predominately Caucasian college-aged population, BREQ-2 was found to be an adequate fit to measure exercise motivation (Abundo, Sidman, Milroy, Orsini, & Fiala, 2014). To verify the data validity within our sample, a confirmatory factor analysis was conducted, using AMOS 24.0 with cut-off values of a CFI >0.90 and a root mean square error of approximation (RMSEA) less than 0.10 (Hu & Bentler, 1999). Cronbach's alpha (α) was used to examine data reliability, considered reliable with an $\alpha > .70$. The findings suggested that good data validity and reliability for this study with a 0.923 for CFI, 0.066 for RMSEA as well as Cronbach's alpha for each of the five sub-scale constructs ranged from 0.750 to 0.900.

3.1.4. Data analysis

IMB SPSS 22.0 statistical software was utilized to examine the data. Descriptive statistics were developed for demographics, including age, gender, race/ethnicity, and student grade classification. Paired T-Test was performed to determine the mean differences between the baseline and post-test data. To verify assumptions associated with parametric statistical tests, Levene's Equality of Variance was used to determine the homogeneity of the data. Independent T-test was used to determine if there were motivation changes related to gender. Pearson's correlation was used to determine if changes in the motivation constructs were correlated to student age. Finally, one-way analysis of variance (ANOVA) was used to evaluate mean change for each of the motivation constructs between race/ethnicities and student classifications. An alpha level of 0.05 was used for all statistical analyses.

3.2. Results

3.2.1. Participants

There were 546 students enrolled in the 21 participating sections of DWHP 1200 course. Of those students enrolled, 500 students signed inform consents and completed the pretest survey. Post-test was completed by 393 students. The attrition (21.4%) was because students either dropped the courses or was absent and declined to fill out the post-test survey. Ten respondents in the post-test surveys were removed because students did not complete many of the questions. The final sample size consisted of 383 students with 126 males and 257 females (Mean age = 19.6; standard deviation = 3.0). Participants included 52% freshman (n =199), 29.5% sophomores (n =113), 10.7% juniors (n =41), and 7.8% seniors (n =30). Additionally, 67.6% respondents were Hispanic (n =259), 20.6% were Caucasian (n =79), 8.9% were African American (n =34), and 2.8% were others (n =11). To ensure the participant demographics in this study represent the overall university, institutional data from 2012 was analyzed for comparison. During the fall and spring semesters of 2012 there were 6979 total students enrolled with 3975 females and 3004 males (Mean age = 29.2; standard deviation = 10.4). University enrolled students consist of 37.9% Hispanics (n =2648), 25.8% Caucasian (n =1804), 11.4% African American (n =796), and 24.8% were other (n = 1731).

3.2.2. Changes of Students' Motivation

As indicated in Table 3.2, results of the Pair-T test showed significant increases among three motivation constructs (i.e., intrinsic and extrinsic motivations as well as

amotivation) and two regulations (introjected and identified regulations). Introjected regulation had the largest increase ($p < 0.001$) followed extrinsic motivation ($p < 0.001$). Amotivation had the least increase ($p < 0.001$). Moreover, change scores across all five motivation constructs did not significantly differ between genders, age, ethnicity, and grade classifications.

Table 3.2 BREQ-2 Motivational Sub-Scales with Corresponding Survey Questions

Subscale/Construct	Range	Pre-Test		Post-Test		<i>t</i>	<i>p</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
Intrinsic Motivation**	1 – 5	3.69	0.98	3.84	0.94	3.29	$p = .001$
Amotivation**	1 – 5	1.25	0.53	1.37	0.73	3.07	$p = .002$
Extrinsic Motivation***	1 – 5	1.79	0.79	1.96	0.89	3.82	$p < .001$
Introjected Regulation***	1 – 5	2.92	1.10	3.10	1.06	3.59	$p < .001$
Identified Regulation***	1 – 5	3.80	0.84	3.95	0.82	3.65	$p < .001$

Note. The *t* values displayed in this table and significance levels (*p* values) were obtained from the paired sample *t* tests in examining the differences between pre-test and post-test. *M* = mean; *SD* = standard deviation. * $p < .05$. ** $p < .01$. *** $p < .001$.

3.3. Discussion

To the best of our knowledge, this is the first study which examine the effects of a required PA course to improve motivations for PA in predominately first year college freshmen. Unlike other studies that focused on Caucasian college students (Milroy, Orsini, D’Abundo, & Sidman, 2013; Sidman et al., 2011; Woekel et al., 2013), demographics of this study is predominately Hispanic (67.6%) females (67.1%). Hispanic females are reported to have the lowest rates of physical inactivity among all

ethnicities in the U.S. (Suminski, Petosa, Utter, & Zhang, 2002). With the national rise of Hispanic females enrolling in colleges (McFarland, Hussar, de Brey, Snyder, Wang, Wilkinson-Flicker, Gebrekristos, Zhang, Rathbun, Barmer, Bullock Mann, &Hinz, 2017), this study adds to the PA literature by studying motivation changes to increase PA in an underrepresented population.

After the completion of the 15-week required PA course in this study, significantly increased scores were found among intrinsic motivation, extrinsic motivation, introjected regulation, and identified regulation among students. A previous study with predominately Caucasian college-aged students found no significant changes among any of the five motivational constructs for students enrolled in a required PA course (Sidman et al., 2011). Our findings from this study suggests that racial/ethnic minority populations might not have the same outcomes associated to Caucasian based populations. The need for more PA studies focusing on Hispanic-based populations is recommended in the future.

In this study, college students in our sample experienced increased changes in extrinsic motivation and introjected regulation, which were on the low self-determination spectrum on the OIT. Previous study conducted by Wilson et al suggested that college students exhibited these motivational changes were more likely to subsequently begin participating in regular PA as a routine (Wilson et al., 2004). This might be due to the students' increases in knowledge of health implications and benefits related to PA participation and adherence (Kim & Cho, 2013). Additional reasons might include the students' desire to pass the required PA course, their perceived pressure to

participate in PA by classmates, and family expectations to do well in college courses. Future studies, however, need to understand the underlying mechanisms to clarify how the extrinsic motivation and introjected regulation changes affect students' participation in PA activities.

The significant increases in identified regulation and intrinsic motivation among participating students demonstrate substantial benefits of this required PA course. In particular, past research suggested that identified regulation and intrinsic motivation, on the self-determination spectrum on the OIT, were associated with positive, long-term behavioral adherence (González-Cutre & Sicilia 2012; Vallerand, 2012; & Deci & Ryan, 2000). In other words, students participating in the PA course might have a greater likelihood to continue participating and adhering to long-term PA. Of interest, similar to previous findings college students in this study have high baseline scores for intrinsic motivation and identified regulation (Brunet & Sabiston, 2011; Wilson, Rodgers, Fraser, & Murray, 2004). Future analysis should further explore mechanisms that influence these initial baseline scores. Lastly, multiple waves of follow-up data collection on PA may be needed for this group of students to measure their long-term PA adherence in the future.

It is worthy to notice that there was a significant change in amotivation. Yet, this finding was not surprising among our sample. Past studies have shown that self-determination on the OIT could be influence by a sense of autonomy (Deci & Ryan, 2000). Given that this is a required PA course, participating students' might have felt as being "forced" to participate in PA and lost their autonomy. Such perceived loss of

choice could have further decreased students' motivation to adhere to the PA required in this course (Ryan & Deci, 2000; & Wilson, Rodgers, Fraser, & Murray, 2004).

This study exhibits a few limitations. First, the dropout rate of this study was 21.4%. Such dropout might be because that students dropped the PA course or preferred not to answer the post-test survey. Second, we measured motivational changes at the beginning and the end of the course. To assess the long-term motivational changes, follow-up data collection is needed in the future. Third, we measured motivation constructs from the OIT (i.e., amotivation, extrinsic motivation, introjected regulation, identified regulation, and intrinsic motivation). Yet, psychological variables associated with changes in those constructs (i.e., autonomy, relatedness, and competence) were not measured. To understand the underlying mechanisms related to the motivation change among the college students in this study, future studies should measure perceived autonomy, relatedness, and comprehension to PA. Finally, the findings of this study are based on a single university setting and may not be generalizable to other institutions.

In conclusion, this study suggests a required PA course promotes positive motivational changes among college students' participation and adhere to PA at a Hispanic Serving Institute in the South Texas. Given that this is a required course, the positive outcomes might have benefited two types of students. The first type of students were those who were already physically active; after the course, they were more likely to continue and adhere to exercise (González-Cutre & Sicilia 2012; Vallerand, 2012; & Deci & Ryan, 2000). The other types of students were those who were not initially engaged in PA; yet, after the course, they might be more inclined to initiate a routine PA

(Wilson et al., 2004). The results of this study can provide college-based health educators and PA teachers not only with guidance in development and delivery of a required PA curriculum in college but also with a solid justification for making a required PA course as a graduation requirement.

3.3.1. What does this article add?

As the majority of PA research focused on elective PA courses, our study makes an important contribution to the field. Specifically, this study adds to our knowledge by providing an empirical evidence that the required PA course facilitated significant changes in the exercise motivation overall among predominately first year college freshmen at a South Texas Hispanic Serving Institute. In other words, all student participants, regardless of previous PA levels, demonstrated exercise motivation enhancements. Based on the results, this study supports the implementation of a required PA course in college. In addition, the sample of this study consisted of a high percentage of Hispanic female participants, which are typically underrepresented within the PA literature. As such, this study helps researchers and educators to develop, implement, and evaluate required PA programs in college settings with Hispanic female populations.

4. EFFECTS OF A FLIPPED CLASSROOM PEDAGOGICAL DELIVERY ON EXERCISE MOTIVATION AMONG COLLEGE STUDENTS

Physiological and psychological health benefits associated with engaging and adhering to a physically active lifestyle have been widely documented (United States Department of Health and Human Services [USDHHS], 1996; Centers for Disease Control [CDC], 2018). Regardless of the benefits, about half of freshmen college students self-report physical activity (PA) levels below the American College of Sports Medicine (ACSM) and American Heart Association's (AHA) daily recommendations which is at least 150 minutes per week of moderate exercise or 75 minutes per week of vigorous exercise (Keating, Guan, Piñero, & Bridges, 2005). Among the freshmen that are physically active, moreover, 7% of them discontinue their aerobic PA participation by the end of their second year of college (Racette, Deusinger, Strube, Highstei, & Deusinger, 2005).

Healthy Campus 2020 has identified that increasing college students' PA participation as a priority (American College Health Association [ACHA], 2012). Young adults between the ages of 18 to 25 are in a critical time associated with exploration, change, and long-term lifestyle choices (Nelson, Story, Larson, Neumark-Sztainer, & Lytle, 2008). Thus, college students are at an important point for adopting healthy behaviors, particularly for PA, that may affect their long-term quality of life (Nelson et al., 2008). In fact, 85% of college seniors who reported being physically active maintained such behavior for at least 10 years after graduation (Keating et al., 2005).

Conversely, 81% of college seniors reporting sedentary behaviors continue being sedentary post-graduation (Keating et al., 2005).

Researchers have advocated that the final opportunity to foster a college students' motivation to participate and adhere to PA may be the implementation of a mandatory PA education curriculum (Woekel, Ebbeck, Concepcion, Readdy, Li, Lee, & Cardinal, 2013). In other words, universities are encouraged to implement required courses that focus on increasing students' PA knowledge and participation (Sparling, 2007). Nevertheless, there are limited studies that specifically examined the effectiveness of required curriculum-based PA courses on students' motivation for PA (Sidman, D'Abundo, 2014; Milroy, Orsini, D'Abundo, and Sidman, 2013; & Sidman, Fiala, and D'Abundo, 2011). Moreover, delivery methods in those studies were only traditional face-to-face approach, online delivery, and blended (mixture of online and face-to-face deliveries).

Flipped course delivery is seen as an effective method to enhance student learning (O'Flaherty & Phillips, 2015). Flipped delivery allows the course content to be delivered outside of the classroom, while still maintaining face-to-face in-class time to further enhance knowledge and understanding through skill-based activities (Tucker, 2012). It has been adopted in college courses in various disciplines, such as basic pharmaceuticals, evolutionary biology, and introduction to teaching profession (Vaughan, 2014; Berrett, 2012; McLaughlin, Roth, Glatt, Gharkholonarehe, Davidson, Griffin, Esserman, Mumper, 2014). Despite the advantages of flipped course delivery over the traditional teaching delivery methods, this delivery had not been examined in the PA

field. In particular, no studies had evaluated how flipped course delivery methods affect students' PA engagement in a required course. To the best of our knowledge, the purpose of this first study is to determine how a flipped class delivery method affected college students' motivation for participation in required PA courses in a Hispanic Serving Institute in the South Texas.

4.1. Methods

4.1.1. Required Flipped PA Course

Dimensions of Wellness (DWHP 1200), offered at The University of the Incarnate Word, is a required core freshman course designed to increase their motivation to PA. DWHP 1200 was designed using the Organismic Integration Theory (OIT), a sub-theory of the Self Determination Theory (SDT). SDT identifies three motivations that impact an individual's participation to PA: amotivation (e.g. completely undesirable), extrinsic motivation (e.g. environmental consequences), and intrinsic motivation (e.g. personal satisfaction and pleasure) (Deci & Ryan, 2000). OIT expands on external motivation by identifying three motivational regulators that lead to intrinsic motivation. These three regulators fall along a continuum (Figure 2.1) that begin with introjected regulation (i.e. ego or self-worth), followed by identified regulation (i.e. personal goal), and finalized with integrated regulation (i.e. enjoyment) (Deci & Ryan, 2000; Deci & Ryan 2008). Individuals having a higher PA participation and adherence rate have been found to be intrinsically motivated. (Deci & Ryan, 2000; Vallerand, 2000).

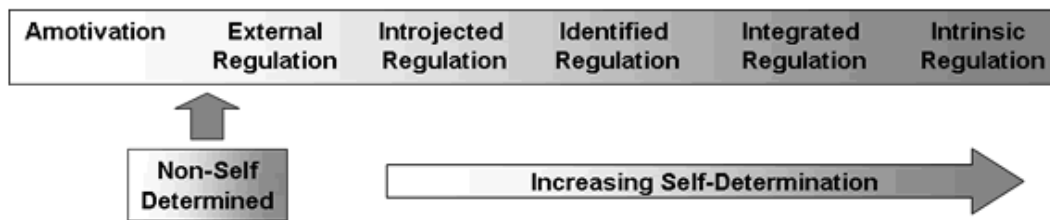


Figure 4.1 Self-determination and the regulation of behaviour: A taxonomy of regulatory styles (Reprinted with permission from Markland, 2014)

DWHP 1200 was a fifteen-week course that meet twice a week for seventy-five minutes each. To ensure the course meet the institution’s accreditation seat time requirement, the course was designed to use a flipped classroom pedagogical method. This means that students reviewed course content outside of class through the university’s blackboard online system prior to in-class meeting. The online content included video recorded PowerPoint lectures focused on health issues, healthy behaviors, PA recommendations, and nutrition and stress management related to PA. During each in-class meeting (initial forty-five minutes), students participated in experiential learning activities designed to allow students the opportunity to observe, practice, and experience the skills related to the content discussed in online video lectures. The final thirty minutes of the course (after the experiential learning activity), instructors and students jointly engaged in aerobic PA. In terms of aerobic PA, during the initial two weeks, instructors provided students with running instructions (i.e. distance, time, and run patterns) to prepare for a 1.5-mile fitness assessment. The following eleven weeks, students were introduced to different types of aerobic PA modalities (e.g. Zumba, Kickboxing, and Circuit Training). Each student completed a second 1.5-mile fitness assessment at the end of the two weeks of the course.

4.1.2. Data Collection Procedure

This study obtained permission from the Institutional Review Board at the University of the Incarnate Word and Texas A&M University. On the first day of the course, students were invited to participate in an evaluation of the course's effect on motivation to PA. Hardcopy informed consent forms and surveys were distributed and collected during the first week (pre-test and baseline) and sixteenth week (post-test) of the course. The course instructors informed students on how to complete the survey and encouraged all students to answer the questions independently and honestly. Students were given assurances that all responses were confidential and that the survey would not influence their course grade. A total of 20 DWHP 1200 sections were offered from fall semester (August – December) of 2014 through spring semesters (January – May) 2015, of which 6 sections were randomly selected to participate in the evaluation. Each section had 24-28 student enrollments.

4.1.3. Instrument

4.1.3.1. Data reliability

The Behavioral Regulation to Exercise Questionnaire 2 (BREQ-2), developed and validated by Markland & Tobin (2004), is a 19-item survey that measures an individual's perceived autonomous or self-determined motivation. The BREQ-2 was found to be an adequate fit to measure exercise motivation among the college-aged population (D'Abundo, Sidman, Milroy, Orsini, & Fiala, 2014). In particular, the BREQ-2 score an individual's perceived motivation using the five OIT continuum subscales: amotivation, extrinsic regulation, introjected regulation, identified regulation, and

intrinsic regulation (Biddle & Nigg, 2000). Each motivational sub-scale categorizes an individual's purpose and/or reason to either participate or not participate in PA. With the assistance of IBM SPSS 22.0, Cronbach's alpha (α) was used to examine the internal consistency reliability with a cutoff point 0.70. The detailed information as well as data reliability of each subscale of the PA motivation were described below.

Amotivation. The 4-item amotivation subscale assessed college students' lack of interest and/or desire to participate in PA with a Cronbach's α coefficient of 0.890. Participants with high amotivational scores have been shown to discontinue participation and adherence of PA (Ryan & Deci, 2000; Wilson et al., 2004). All questions were rated on a 5-point Likert-type scale ranging from "not at all true for me" to "very true to me". One example question was "I think exercising is a waste of time".

Extrinsic regulation. Extrinsic regulation consisted of 4-items that measured external influences (i.e. physical changes, compliments, and awards) to PA participation (Deci, Vallerand, Pelletier, Ryan, 1991). This subscale had an acceptable data reliability ($\alpha = .762$). College students rated a five-point Likert scale, ranging from "not at all true for me" to "very true to me", responding to four survey questions, such as "I exercise because other people say I should?" (Markland & Tobin, 2004). Individuals that are extrinsically motivated tend to have lower rates of long-term adherence in PA participation (Deci et al., 1991).

Introjected regulation. The 3-item introjected regulation subscale were rated based on a 5-point Likert-type scale ranging from "not at all true to me" to "very true to me" to three questions: "I feel guilty when I don't exercise", "I feel ashamed when I

miss an exercise session”, and “I feel like a failure when I haven’t exercised in a while”. In other words, introjected regulation measured college students’ perception of PA participation based on avoiding negative feelings (i.e., guilt or anxiety). This subscale had a Cronbach’s α coefficient of 0.759.

Identified regulation. Using a 5-point Likert-type scale (ranging from “not true to me” to “very true to me”), the 4-item identified regulation assessed college students’ PA participation based on valuing a personal goal and/or benefit with a Cronbach’s α coefficient of 0.733. For example, students were asked “It’s important to me to exercise regularly” and “I get restless if I don’t exercise regularly”.

Intrinsic regulation. The 4-item intrinsic regulation used a 5-point Likert-type scale to measure the college students’ motivation based on the interest and joy of the activity. For example, ranging from “not at all true for me” to “very true to me”, college students were asked to respond to the survey question: “I exercise because it’s fun?”. Intrinsic regulation’s Cronbach’s α coefficient of .878 reflected a good data reliability. Intrinsic regulation is associated with college students’ long-term adherence to PA participation (Ünlü, 2016; Wilson et al., 2004).

4.1.3.2. Data validity

For this study, using AMOS 24.0, a confirmatory factor analysis was conducted to test the data validity. Model fit was assessed by normed chi-square (CMIN/DF), root mean square error of approximation (RMSEA), and comparative fit index (CFI). Goodness of fit were considered with a CMIN/DF < 5 (Marsh & Hocevar, 1985), a CFI ≥ 0.90 and a RMSEA ≤ 0.10 (Hu & Bentler, 1999). Confirmatory factor analysis (Figure

4.2) of BREQ-2 demonstrated an adequate fit for measuring the exercise motivation among this study's participants (CMIN/DF = 1.837; CFI=0.913; and RMSEA= 0.074).

Figure 4.2 shows the factor loadings of confirmatory factor analysis within our sample.

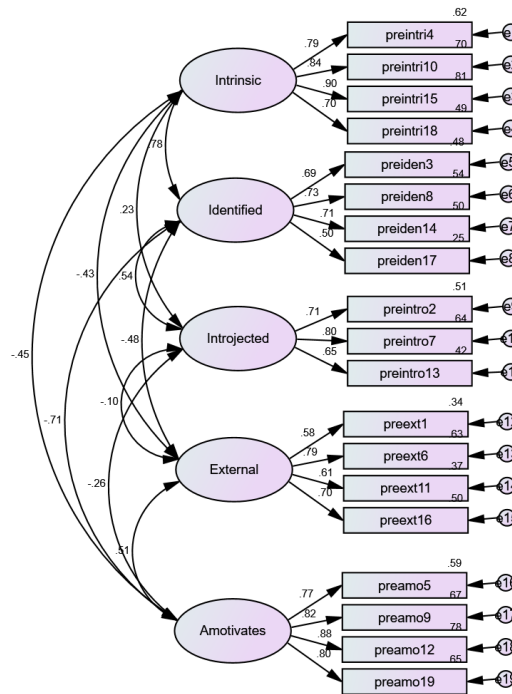


Figure 4.2 Factor Loadings of Confirmatory Factor Analysis among college students in our sample

4.1.4. Data Analysis

Using Statistical Package for the Social Sciences (SPSS) 22.0 (SPSS Inc., Chicago, IL), data were analyzed using inferential and descriptive procedures, including independent t-test, paired t-test, and Pearson's correlation. Levene's Equality of Variance was utilized to determine the homogeneity of the data. Welch robust test of

equality of means was used due to the relatively small sample and unequal variances for both ethnicity and student classification. Descriptive statistics included frequency and percentage for age, gender, ethnicity, and student grade classification. Statistical significance was accepted at the $p < .05$ level of probability.

4.2. Results

4.2.1. Institutional Demographics

In August of 2014, the start of the academic year, a total of 8649 students were enrolled in the university with a mean age = 30.7 (SD = 10.9). There were a greater number of female students (54.7%; $n = 4728$) enrolled than male students (45.3%; $n = 3921$). At this time, Hispanic students made up the highest percentage of enrollees (32.5%; $n = 2814$), followed by Caucasian students (24.5%; $n = 2122$), then students identifying as other (29.7%; $n = 2568$), and finally of African American students (13.2%; $n = 1145$).

4.2.2. Sample Characteristics

The mean age for 152 participating college students was 20 (SD= 2.6). As shown on Table 4.1, Hispanic students made up the largest portion of the participants (60.5%), followed by African American students (24.3%), Caucasian students (7.2%), and others (5.9%). Additionally, there were a greater number of female students (55.9%) compared to male students (42.1%). Grade classifications for participating students ranged from 35% of sophomores ($n=54$), 32% of freshmen ($n= 49$), 22% of juniors ($n= 33$), and 7% of seniors ($n=10$).

Table 4.1 Demographic Information of participating college students

Participant Descriptive	Number	Percentage
Gender		
Female	85	55.9
Male	64	42.1
Race		
Hispanic	92	60.5
African-American	37	24.3
Caucasian	11	7.2
Other	9	5.9
Grade Classification		
Freshman	49	32.2
Sophomore	54	35.5
Junior	33	21.7
Senior	10	6.6

4.2.3. Changes of amotivation, extrinsic motivation, introjected regulation, identified regulation, and intrinsic motivation scores at the beginning of the DWHP course (pre-test) and end of the DWHP course (post-test)

Table 4.2 shows the changes of amotivation, extrinsic motivation, introjected regulation, identified regulation, and intrinsic motivation scores at the beginning of the DWHP course and end of the course. Among the five scales, only intrinsic motivation was found to have a statistically significant change in a positive direction ($p = 0.027$). No statistically significant differences were found for amotivation ($p = 0.276$), extrinsic motivation ($p = 0.276$), introjected regulation ($p = 0.797$), and identified regulation ($p = 0.219$). Further data analysis indicated that the independent t-test for gender, Pearson's

correlation for age, and Welch robust test of equality of means for ethnicity and grade classification were not statistically associated with the changes in amotivation, extrinsic motivation, introjected regulation, identified regulation, and intrinsic motivation scores.

Table 4.2 Comparison of amotivation, extrinsic motivation, introjected regulation, identified regulation, and intrinsic motivation scores at the beginning of the DWHP course (pre-test) and end of the DWHP course (post-test)

Measured Variables	Possible Range	Beginning of Course		End of Course		<i>P</i>
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Amotivation	1 - 5	1.23	0.55	1.30	0.65	0.276
Extrinsic Motivation	1 - 5	1.86	0.85	1.99	0.90	0.124
Introjected Regulation	1 - 5	3.26	1.08	3.24	1.01	0.797
Identified Regulation	1 - 5	4.11	0.78	4.19	0.69	0.219
Intrinsic Motivation	1 - 5	3.98	0.84	4.14	0.84	0.027*

*Significant motivational increase post course score ($p < .05$)

4.3. Comment

This study contributes to the current PA literature in two aspects. First, the flipped course delivery approach has been used in different academic disciplines (Vaughan, 2014; Berrett, 2012; McLaughlin et al., 2014), except the field of PA. To the best of our knowledge, this is the first study to evaluate the effect of a flipped class delivery method in a required PA course on college students' motivation to participate and adhere to PA. Second, participants of previous studies examining changes in college students' PA motivation where predominately Caucasian (Milroy et al., 2013; Everhart

& Dimon, 2013; Sidman et al., 2011; Woekel et al., 2013). Our study consists of an overwhelming racial/ethnic minority with Hispanics (61%) and African Americans (25%).

After completing the required 15-week flipped PA (DWHP) course, results of this study suggested a positive changes in intrinsic motivation among participating college students. Yet, the other four motivational sub-scales (i.e., amotivation, extrinsic regulation, introjected regulation, and identified regulation) were found to have no statistically significant changes. In addition, gender, age, and class classification were not statistically associated with the changes in amotivation, extrinsic motivation, introjected regulation, identified regulation, and intrinsic motivation scores. Given that amotivation, extrinsic regulation, introjected regulation, and identified regulation were OIT motivational sub-scales, they have been found to have an impact on college students' participation and adherence to PA. For example, college students experiencing change in extrinsic motivation and/or introjected regulation were more likely start participating in a regular PA route. Similarly, college students who demonstrated enhancements in identified regulation and/or intrinsic motivation had a higher likelihood of adhering to regular PA (Wilson et al., 2004; González-Cutre & Sicilia 2012; Vallerand, 2012; & Deci & Ryan, 2000). Accordingly, a flipped course delivery method might not be a very effective pedagogical method to enhance the motivational impact for college students participating in a required PA course. More studies with similar or different samples, however, may need to be conducted in the future to compare our findings and understand the underlying mechanism.

4.4. Limitations

This study focused on measuring changes in the OIT motivational sub-scales (i.e., amotivation, extrinsic motivation, introjected regulation, identified regulation, and intrinsic motivation) within a flipped course delivery, but we did not measure changes in autonomy, competence, and relatedness to PA, which were psychological variables associated with changes in the five OIT motivational sub-scales. Measuring changes in autonomy, competence, and relatedness to PA may help explain why the flipped method delivery only affected on intrinsic motivation. In addition, the results of this study were based on outcomes specific to a single South Texas Hispanic Serving Institute and may not be generalizable to other college populations.

4.5. Conclusion

To the best of our knowledge, this first study is to determine how a flipped class delivery method affected 152 predominately minority college students' motivation for participation in required PA courses in a Hispanic Serving Institute in the South Texas. Our findings suggest that a flipped course delivery in a required PA course might result in minimal positive motivational changes to PA participation and adherence within racial/ethnic minority college students. There are several possible factors that may have been an influencing factor to this study's findings. First, the students in this study may not have been sufficiently prepared for in-class activities (Al-Zahrani, 2015). Lack of in-class readiness may be attributed to student not doing the extra work outside of class or students not having technology access at home to complete the online portion of the course. Second, course instructors may not be providing effective feedback during the

in-class time (Al-Zahrani, 2015). All instructors were trained on the predesigned blackboard online site and how to conduct in-class experiential learning activities. However, proper and effect feedback training was not provided to instructors teaching the course and may have affected student content understanding. Finally, online videos and material may not be clearly and effectively presenting the content (Al-Zahrani, 2015).

Overall, more studies are needed to understand if this pedagogical method is an effective teaching method for PA course. Moreover, college-based health and PA instructors may need to carefully consider the pros and cons of implementing a flipped delivery method within their student population. For health and PA instructors who are currently using a flipped course delivery method in their PA courses, a program evaluation may help to determine if such method is effectively meeting the course goal.

4.5.1. Conflict of interest disclosure

The authors have no conflicts of interest to report. The authors confirm that the research presented in this article met the ethical guidelines, including adherence to the legal requirements, of the United States and received approval from the University of the Incarnate Word and Texas A&M University.

5. CONCLUSION

The purpose of this dissertation is to examine change of motivation to PA participation and adherence for college students enrolled in a two pedagogically different mandatory PA based wellness program in a South Texas four-year Hispanic Serving Institution. To achieve this purpose, one literature review and two journal articles were written 1) discusses the current literature that focuses on outcomes related to “required” PA college courses (Chapter II), 2) present the quantitative results of motivational changes among college students registered in a required face-to-face PA and wellness course (Chapter III), and 3) provide the quantitative results for motivational changes to student behavior of exercise when the required PA course content was delivered in a flipped classroom format (Chapter IV).

The findings of the literature review identified several areas of interest. First, even though college campuses provide an excellent opportunity to implement PA programs, required PA course offerings are steadily declining (Henry, Klein, Kempland, Oswalt, & Rexilius, 2017). Second, findings suggest that PA programs have greater positive short-term outcomes but fail to have similar positive long-term effects. This may be a result of program theories focusing heavily on participant’s current stage of behavior (TTM), and not taking into consideration long-term motivational constructs (SDT) related to PA adherence. Finally, there are limited studies that focus specifically on the effectiveness of delivery methods related to required curriculum-based PA courses (Keating et al., 2005), and to the best of our knowledge, no study evaluated the effects a flipped pedagogical design had on motivation to PA.

The first journal manuscript (Chapter III) provided support that a required PA course had a significant impact among all OIT motivational sub-scales for college students regardless of current PA participation behaviors. It is important to note, that these motivational changes were within primarily Hispanic female college students and might have a greater impact among a traditionally underrepresented population (Suminski, Petosa, Utter, Zhang, 2002). A previous study focusing on PA motivational in racial/ethnic minority female college students were unable to gather enough data to provide conclusive outcomes (Hassel et al., 2015). This study suggests that college students participating in this PA course are more likely to either initiate a personal PA routine (Wilson et al., 2004) and /or continue to participate in long-term PA (González-Cutre & Sicilia 2012; Vallerand, 2012; & Deci & Ryan, 2000). Consequently, Chapter III provides support for implementing a graduation required PA course for all attending college students. Furthermore, this study helps researchers and educators develop, implement, and evaluate required PA programs in college settings for Hispanic female populations.

The second manuscript (Chapter IV) suggests that a flipped PA course delivery in a required PA course might result in minimal positive motivational changes to PA participation and adherence within racial/ethnic minority college students. This study only found a statistical significance change for intrinsic motivation. The other four OIT motivational sub-scales were found to have no statistically significant changes. These findings suggest that the flipped design might not be effectively meeting the psychological variables (autonomy, competence, and relatedness) associated with

changes in the five OIT motivational sub-scales. Possible factors that might have impacted the outcomes include 1) college students not being sufficiently prepared for in-class activities, 2) course instructors may not be providing effective feedback during the in-class time, and 3) online videos and material may not be clearly and effectively presenting the content (Al-Zahrani, 2015). Further studies should focus on student perception of participating in a flipped PA course by conducting process evaluation using focus groups, questionnaire, and reflective writings as a form of data collection. Additionally, instructor experience and perception of flipped course effectiveness should be further investigated through questionnaire and interviews.

In conclusion, future research is recommended to include 1) an analysis of college students perceived autonomy, competence, and relatedness to the required PA course, 2) comparison analysis to determine if face-to-face or flipped pedagogical delivery method would have a greater impact on college-student PA motivation, and 3) a longitudinal study to measure long-term impact the required PA course has on college-student motivation.

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APPENDIX A

EXERCISE REGULATIONS QUESTIONNAIRE (BREQ-2)¹

Age: _____ years Sex: male female (please circle)

Ethnicity: Caucasian Hispanic African American Other

Grade Classification: Freshman Sophomore Junior Senior

WHY DO YOU ENGAGE IN EXERCISE?

We are interested in the reasons underlying peoples' decisions to engage, or not engage in physical exercise. Using the scale below, please indicate to what extent each of the following items is true for you. Please note that there are no right or wrong answers and no trick questions. We simply want to know how you personally feel about exercise. Your responses will be held in confidence and only used for our research purposes.

	Not true for me	1	2	3	4 Very true for me
1 I exercise because other people say I should	0	1	2	3	4
2 I feel guilty when I don't exercise	0	1	2	3	4
3 I value the benefits of exercise	0	1	2	3	4
4 I exercise because it's fun	0	1	2	3	4
5 I don't see why I should have to exercise	0	1	2	3	4
6 I take part in exercise because my friends/family/partner say I should	0	1	2	3	4

¹ *Reprinted with permission from *Exercise Motivation Measurement*, by Dr. David Markland, 2014, The School of Sport Health & Exercise Sciences, Bangor University. Copyright [2007] by David Markland PhD.

7	I feel ashamed when I miss an exercise session	0	1	2	3	4
8	It's important to me to exercise regularly	0	1	2	3	4
		Not true for me		Sometimes true for me		Very true for me
9	I can't see why I should bother exercising	0	1	2	3	4
10	I enjoy my exercise sessions	0	1	2	3	4
11	I exercise because others will not be pleased with me if I don't	0	1	2	3	4
12	I don't see the point in exercising	0	1	2	3	4
13	I feel like a failure when I haven't exercised in a while	0	1	2	3	4
14	I think it is important to make the effort to exercise regularly	0	1	2	3	4
15	I find exercise a pleasurable activity	0	1	2	3	4
16	I feel under pressure from my friends/family to exercise	0	1	2	3	4
17	I get restless if I don't exercise regularly	0	1	2	3	4
18	I get pleasure and satisfaction from participating in exercise	0	1	2	3	4
19	I think exercising is a waste of time	0	1	2	3	4

Thank you for taking part in our research