THE 3 × 2 ACHIEVEMENT GOAL MODEL AND MOTIVATIONAL REGULATIONS IN COLLEGE PHYSICAL ACTIVITY CLASSES

A Dissertation

by

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ABSTRACT

Achievement goal research in physical activity (PA) classes is primarily guided by the dichotomous, trichotomous, and 2 × 2 achievement goal models. However, the utility of the latest 3 × 2 achievement goal model has not been examined in PA settings. Particularly, this latest model and motivational regulations as they relate to students' achievement/educational outcomes have not been extensively examined in college PA settings. A lack of such information may limit instructors' understanding of what motivates students in college PA settings. Therefore, this study addressed this deficiency by answering the following four research questions: (1) What are the psychometric properties of the 3 × 2 achievement goal questionnaire (3 × 2 AGQ) and the behavioral regulation in exercise questionnaire-3 (BREQ-3) among American college students in PA classes? (2) What is the predictive power of the achievement goals and motivational regulations in students' achievement/educational outcomes? (3) Do motivational regulations mediate the relationships between the achievement goals and students' achievement/educational outcomes? (4) What perceived experiences/factors contribute to students' endorsement of achievement goals?

Accordingly, questionnaire data, accelerometer data, and interview data were collected from a sample of 556 students (M = 20.31 years, SD = 1.34; 305 males; 251 females) enrolled in PA classes at a major university in the southwest U.S. Confirmatory factory analyses (CFAs) and Cronbach alpha analyses revealed that the 3 × 2 AGQ failed to assess task-approach, self-approach, other-approach, task-avoidance, self-avoidance, and other-avoidance goals as construed in the 3 × 2 model of achievement goals but served as a reliable and valid measure assessing task/self-approach, task/self-avoidance, other-approach, and other-avoidance goals in

the current study. These analyses also revealed that the BREQ-3 (with one item removed) can reliably and validly assess intrinsic regulation, integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation as theorized in self-determination theory in American college PA classes. Structural equation modeling analyses (SEM) revealed that task/self-approach goals, integrated regulation, and identified regulation significantly predicted persistence/effort; task/self-approach goals, intrinsic regulation, and integrated regulation significantly predicted enjoyment; other-approach goals and integrated regulation positively predicted perceived health, but other-avoidance goals and introjected regulation negatively predicted perceived health; and intrinsic regulation and amotivation were significant positive predictors of moderate to vigorous physical activity (MVPA; assessed by accelerometers). Finally, SEM found that more self-determined motivation fully or partially mediated the relationships between achievement goals and students' achievement/educational outcomes.

The interview data provided some support to the questionnaire data in the current study and showed that students used task-, self-, or other-based competence to justify their achievement goal endorsement. The interview data also provided additional support to the view that the learning environment can influence students' achievement goals.

DEDICATION

I would like to dedicate this dissertation to

all my family

for their love, encouragement, and support.

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CHAPTER I

INTRODUCTION

College students are at a critical age because choosing to engage in physical activity (PA) can impact the rest of their lives. Engagement in moderate to vigorous physical activity (MVPA) can lead to better physical and psychological well-being (Edwards, 2003; Myers, 2003). However, research reveals an overall lack of participation in PA among college students (Dinger & Waigandt, 1997; Douglas et al., 1997). Promoting PA among college students, therefore, is a critical issue to both researchers and practitioners.

One way to address this issue is to better understand college students' motivation toward PA participation. If we want students to engage in PA, they must first want to participate in and enjoy the activities. Motivation is defined as the energization, direction, and regulation of behavior (Roberts, 2001) that, in turn, influences student achievement/educational outcomes such as effort, persistence, enjoyment, performance (e.g., final grade) and perceived health.

Achievement goal theory (AGT; Dweck, 1986; Elliot, 1999; Elliot & Harackiewicz, 1996; Elliot, Murayam, & Pekrun, 2011; Nicholls, 1989) and self-determination theory (SDT; Deci & Ryan, 1985, 2000; Ryan & Deci, 2000) reveal the importance of understanding students' motivation and related cognitive, affective, and behavioral outcomes in physical education/PA settings (e.g., Agbuga & Xiang, 2008; Shen, Chen, &, Guan, 2007; Wang, Liu, Lochbaum, & Stevenson, 2009). Therefore, AGT and SDT can provide the theoretical perspectives to understand educational/achievement outcomes (e.g., persistence/effort, enjoyment, perceived health, physical activity, and achievement) of college students in a physical activity setting.

The 3 × 2 achievement goal model represents the latest theorization of achievement goals in AGT. It is composed of six achievement goals: task-approach, task-avoidance, self-approach, self-avoidance, other-approach, and other-avoidance. Compared to the previous goal models (i.e., dichotomous, trichotomous, and 2 × 2 achievement goal model), this model has shown to have more explanatory power in understanding students' motivation and related outcomes in achievement settings (Elliot, Murayama, & Pekrun, 2011). The reliable and valid measure of the model is known as the 3 × 2 Achievement Goal Questionnaire (Diseth, 2015; Elliot et al., 2011; Ning, 2016). However, both the model and the measure have not been examined in college PA settings.

In self-determination theory, motivational regulations represent different motives that define the reasons why individuals practice and sustain their participation in physical activity (Hellin, Moreno, & Rodriguez, 2004). Six motivational regulations have been identified as a 6-factor model, consisting of amotivation, external regulation, introjected regulation, identified regulation, integrated regulation, and intrinsic regulation (Markland & Tobin, 2004; Wilson, Rodgers, Loitz, & Scime, 2006). The Behavioral Regulation in Exercise Questionnaire -3 (BREQ-3) has been considered the only reliable and valid measure assessing this 6-factor model of motivational regulations in PA/physical education settings (Wilson et al., 2006). Similar to the 3 × 2 achievement goal model and the 3 × 2 Achievement Goal Questionnaire, the 6-factor model of motivational regulations and its corresponding measure, the BREQ-3, have rarely been examined in relation to students' motivation and related outcomes in college PA settings

Considering the importance of AGT and STD in understanding student motivation and related cognitive, affective, and behavioral outcomes in a variety of settings, researchers have examined links between the two theories in physical activity settings. (Conroy, Kaye, &

Coatsworth, 2006; Moreno, González-Cutre, Sicilia, & Spray, 2010; Su, McBride, & Xiang, 2015). Gao and colleagues (2012) examined achievement goals, motivational regulations, and their relations to effort/persistence in college PA classes. Findings revealed mastery-approach and performance-approach goals positively predicted intrinsic regulation, mastery-approach goals positively predicted identified regulation, and these variables all positively predicted students' effort/persistence in PA classes. These findings seem to suggest that motivational regulations might mediate relationships between achievement goals and achievement/educational outcomes. Such meditation was indeed explored and examined in at least two studies. In a sample of Hungarian youth, Biddle, Soos and Chatzisarantis (1999) found that identified regulation and intrinsic regulation mediated the relationship between task orientation (i.e., mastery goal) and intention to participate in sport. Georgiadis, Biddle, and Chatzisarantis (2001) observed similar findings with a sample of adult exercisers in Greece. They reported that identified regulation and intrinsic regulation mediated the relationship between task orientation and physical self-worth. They also found that identified regulation and intrinsic regulation mediated the relationship between ego orientation (i.e., performance goal) and physical self-worth. Both studies, however, focused on the dichotomous model of achievement goals. Considering that the development of AGT has also resulted in the trichotomous model, 2 × 2 model, and 3 × 2 model, there is a need to examine the mediation of motivational regulations in these models.

As reviewed above, the 3 × 2 achievement goal model, the 6-factor model of motivational regulations, and their corresponding measures have not been extensively examined in relation to achievement/educational outcomes (i.e., persistence/effort, enjoyment, perceived health, and physical activity) in college physical activity settings. Therefore, the present study was designed

to address this deficiency in our knowledge base on college student motivation for PA participation. Specifically, this study examined the application of the 3 × 2 achievement goal model and the 6-factor model of motivational regulations, relationships between these two models, and their predictions of students' achievement/educational outcomes in college PA classes. The four research questions to be answered in this study included: (1) What are the psychometric properties of the 3 × 2 achievement goal questionnaire (3 × 2 AGQ) and the behavioral regulation in exercise questionnaire-3 (BREQ-3) among American college students in PA classes? (2) What is the predictive power of achievement goals and motivational regulations in students' achievement/educational outcomes? (3) Do motivational regulations mediate the relationships between achievement goals and students' achievement/educational outcomes? (4) What perceived experiences/factors contribute to students' endorsement of achievement goals?

The following sections of this chapter review the literature on (a) achievement goal theory (AGT) with a focus on four achievement goal models (i.e., dichotomous, trichotomous, 2 × 2 model, and 3 × 2 model) and related measures, (b) self-determination theory (SDT) with a focus on six motivational regulations (i.e., amotivation, external, identified, integrated, and intrinsic regulations) and related measures, (c) links between achievement goals and motivational regulations, (d) mediation of motivational regulations, particularly in the relationship between achievement goals and achievement/educational outcomes, and (e) persistence/effort, enjoyment, perceived health, physical activity, and perceived experience of college PA classes, as these variables served as outcome variables in the present study.

1.1 Achievement Goal Theory

Since the late 1970s and early 1980s, achievement goal theory has emerged as a major theoretical perspective to understand and explain individuals' motivation and related cognitive, affective, and behavioral responses in a variety of achievement settings, including physical education and Physical Activity (PA) settings (Agbuga & Xiang, 2008; Ames, 1992b; Dweck & Leggett, 1988; Gao, Podlog, & Harrison, 2012; Nicholas, 1984; Shen, Chen, & Guan, 2007; Wang, Liu, Lochbaum, & Stevenson, 2009). Over these years, this theory has evolved from a dichotomous model (mastery goal and performance goal) to a trichotomous model (mastery goal, performance-approach goal, and performance-avoidance goal), to a 2 × 2 model (mastery-approach goal, mastery-avoidance goal, performance-approach goal, and performance-avoidance goal), and finally to a 3 × 2 model (task-approach goal, task-avoidance goal, self-approach goal, self-avoidance goal, others-approach goal, and others-avoidance goal).

Along with the model development, achievement goal theory research has progressed in the following ways: theorists posit a conceptual model, and researchers develop measures to assess the model and then utilize the measures to conduct empirical work. In physical education/PA, researchers have generally adapted and validated the achievement goal measures developed in the classroom settings in the examination of students' achievement goals and related cognitive, affective, and behavioral responses.

1.1.1 The Dichotomous Model

According to Nicholls (1984), achievement goals are defined as how individuals evaluate their competence and subjectively aim for successful goal accomplishment. He assumed that each individual's purpose in an achievement setting is to demonstrate ability, and theorized that

ability can be construed as either undifferentiated or differentiated. The undifferentiated conception of ability is reflected when an individual does not distinguish ability from effort. The individual associates an increase in effort with greater ability. Thus, ability can be enhanced if there is sufficient effort put forth. In contrast, the differentiated conception of ability is reflected when an individual distinguishes ability from effort. Ability is not judged based on task mastery and effort, but rather on comparison with others. Based on the two conceptions of ability, Nicholls proposed two distinctive achievement goals, labeled task and ego involvement (task orientation and ego orientation). Task involvement refers to the state associated with the aim of acquiring ability, which is defined undifferentiated, whereas ego involvement refers to the state where an individual seeks to demonstrate ability, which is defined as differentiated. Dweck (1986) defined achievement goals as involving a program of cognitive processes that have cognitive, affective, and behavioral consequences. The theorist also proposed two contrasting goals, labeled learning and performance goals. Learning goals aim to develop competence or master a task, and conversely performance goals seek to demonstrate one's competence. Additionally, Ames (1992b) and Maehr (1989) defined achievement goals as the purposes students perceive for engaging in achievement related behaviors, such as developing and demonstrating competence. They distinguished achievement goals between mastery and performance goals. With mastery goals, individuals intend to master new skills, develop their knowledge, value learning, and believe that with sufficient effort they can expand their intellectual competencies. In contrast, with performance goals, individuals are concerned about displaying their own competence and succeeding by outperforming others or accomplishing goals with little effort.

Although these theorists differed on the terminology of achievement goals, the conceptual relationship they theorized among task involvement, learning and mastery goals and among ego involvement and performance goals are considered convergent (Ames & Archer, 1987). Consequently, these achievement goals have been integrated and identified as two contrasting goals in the dichotomous model: mastery verses performance. It is assumed that these two achievement goals can affect students' achievement/educational outcomes, including their attitudes toward classes and learning related behaviors and performance. More specifically, mastery goals are associated with positive motivational and learning outcomes (e.g., increased effort/persistence, positive affect, greater use of elaborative cognitive strategies, adaptive attributional patterns of success and failure), whereas performance goals are related to negative and maladaptive outcomes such as avoiding challenging activities and giving up in the face of difficulty.

Empirical research has supported the dichotomous model and revealed that mastery goals were positively associated with and performance goals were negatively associated with a number of achievement/educational outcomes, including intrinsic motivation, persistence/effort, perceived competence, and intention (Ames, 1992b; Dweck & Leggett, 1988; Nicholas, 1984; Solmon & Boone, 1993; Xiang & Lee, 1998, 2002). Henderson and Dweck (1990) examined achievement goal differences associated with educational outcomes among junior high students in a classroom setting. They found that students who adopted high mastery goals were more likely to put forth high effort and make fewer helpless responses to failure. Inversely, students who adopted high performance goals were more likely to make low effort and helpless attributions when faced with difficulty. With a sample of academically advanced students in a junior high/high school, Ames (1992b) observed that mastery goals positively predicted learning

strategies, preference for challenging tasks, and positive attitudes toward learning, while performance goals were not related to the use of learning strategies or task choices but were negatively, although not strongly, related to attitudes toward learning and self-perceptions of ability.

Similar results were found in physical education/PA settings. Duda (1988) investigated college-level intramural sport participants and found that participants who adopted mastery goals (i.e., task involvement) practiced their sports more than participants who adopted performance goals (i.e., ego involvement). Solmon and Boone (1993) examined the influence of achievement goals on college students' learning outcomes in beginning tennis classes. Their study revealed that students with mastery goals were more likely to engage in adaptive patterns of behavior such as choosing challenging tasks and focusing on effort, whereas students with performance goals tended to avoid challenge and be unwilling to expend effort. Xiang, Bruene, and McBride (2004) examined relationships between achievement goals and student achievement behaviors in an elementary physical education running program called Roadrunners. They reported that only mastery goals were positively related to both students' persistence/effort in Roadrunners and their one-mile run performance.

The dichotomous model has been challenged by several researchers (Elliot, 1999; Elliot & Harackiewicz, 1996; Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997; Middleton & Midgley, 1997; Skaalvik, 1997), because the research findings about the link between performance goals and outcomes were not consistent. Some researchers (e.g., Ames, 1992b; Butler, 1992; Elliott & Dweck, 1988) revealed that performance goals elicited negative processes and achievement/educational outcomes. For example, Elliott and Dweck (1988) revealed that performance goals were associated with maladaptive outcomes (e.g., low perceived competence

and lack of interest in a task) in sixth-grade classes. Other researchers (Elliot & Harackiewicz, 1996; Harackiewicz et al., 1997; Harackiewicz & Elliot, 1993; Xiang, Lee, & Shen, 2001), however, found that performance goals were shown to have a null or positive influence on adaptive outcomes (e.g., perceived competence and intrinsic motivation) in certain types of achievement contexts such as school and physical education settings. For example, Harackiewicz et al. (1997) found that performance goals were positively related to college students' achievement/educational outcomes, including test anxiety, perceived competence, and interest. To clarify the mixed pattern of results associated with performance goals, Elliot and colleagues (Elliot, 1999; Elliot & Church, 1997; Elliot & Harackiewicz, 1996) proposed a trichotomous model, which will be described later.

To assess individual differences in achievement goals in sport and physical education/PA settings, Duda and colleagues (Duda, 1989; Duda & Whitehead, 1998; Duda, Olson, & Templin, 1991; Duda & Nicholls, 1992) developed an achievement goal questionnaire, labeled Task and Ego Orientation in Sport Questionnaire (TEOSQ; see Appendix A). In the TEOSQ, task orientation (i.e., mastery goal) is assessed with 7 items (e.g., "I feel most successful in sport when I work really hard."), and ego orientation (i.e., performance goal) is assessed with 6 items (e.g., "I feel most successful in sport when I score the most points."). The responses are provided on a 5-point Likert scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*). For more than 20 years in the past, the TEOSQ has been successfully adapted to physical education settings from elementary schools to colleges, and in countries like the United States (Dunn, 2000; Solmon & Boone, 1993; Xiang & Lee, 1998), Greece (Papaioannou, 1990; Papaioannou & Macdonald, 1993), Great Britain (Goudas, Biddle, & Fox, 1994; Hall & Earles, 1995; Spray & Biddle, 1997), and China (Xiang, Lee, & Shen, 2001).

Another questionnaire similar to the TEOSQ is the Perception of Success Questionnaire (POSQ; Treasure & Roberts, 1994). As shown in Appendix B, mastery goal (i.e., task orientation) is assessed with 6 items (e.g., "I feel most successful when I perform to the best of my ability."), and performance goal (i.e., ego orientation) is assessed with 6 items (e.g., "I feel most successful when I outperform my opponent."). The responses are provided on a 5-point Likert scale ranging from A (*strongly agree*) to E (*strongly disagree*). Studies have provided empirical support that the POSQ is a reliable and valid measure of student achievement goals in sports and physical education/PA settings (Treasure & Roberts, 1994; Roberts, Treasure & Balague, 1998; Standage & Treasure, 2002; Wang, Chatzisarantis, Spray, & Biddle, 2002).

1.1.2 The Trichotomous Model

As reviewed earlier, some studies revealed mixed findings regarding relationships between performance goals and student outcomes (Ames 1992b; Harackiewicz et al., 1997; Xiang & Lee, 2002). To clarify the nature of performance goals, Elliot and colleagues (Elliot, 1999; Elliot & Church, 1997; Elliot & Harackiewicz, 1996) revised the dichotomous model and proposed the trichotomous model. Specifically, in the 1990s and 2000s, Elliot and colleagues argued that the dichotomous model does not adequately address the issue of energization of behavior and fails to distinguish between approach and avoidance motivation as depicted in the achievement motive approach (Atkinson, 1964). Thus, they proposed a set of achievement goal models to extend the dichotomous model through the incorporation of avoidance and approach goals. One such model is a trichotomous achievement goal model (Elliot & Church, 1997). In this model, the mastery goal construct remained the same as that in the dichotomous model (focusing on learning, understanding, and development of competence) but the performance goal

construct was bifurcated to approach and avoidance, resulting in three separate goals: mastery goals, performance-approach goals, and performance-avoidance goals. Performance-approach goals focus on having favorable judgments of competence relative to others, while performance-avoidance goals focus on avoiding unfavorable judgments of competence relative to others (Elliot & Church, 1997; Elliot & Harackiewicz, 1996). Both mastery goals and performance-approach goals are considered approach orientations because they indicate regulation according to adaptive or positive potential outcomes (e.g., increased persistence/effort and high absorption during task engagement). The performance-avoidance goals are considered avoidance orientations because they indicate regulation according to maladaptive or negative potential outcomes (e.g., decreased persistence/effort, low absorption during task engagement, and poor performance).

To date, the trichotomous model has been widely examined and the resulting work has supported its utility in the academic and physical education domains. In a classroom study employing this model, Elliot and Church (1997) revealed that mastery goal construct remained the same as that in the dichotomous model, and performance-approach goals were related to positive student outcomes such as task engagement and high performance on tests, whereas performance-avoidance goals were related to negative student outcomes such as avoidance of help seeking and low achievement. With a sample of undergraduates enrolled in an introductory level psychology course, Elliot, McGregor, and Gable (1999) reported that mastery goals were positive predictors of deep processing, persistence, and effort; performance-approach goals were positive predictors of surface processing, persistence, effort, and exam performance; and performance-approach goals and performance-avoidance goals both negatively predicted deep processing and exam performance.

In the physical education/PA settings, Cury et al. (2002) study provided support for the trichotomous goal model. They reported that mastery goals and performance-approach goals had a positive effect on intrinsic motivation with early adolescent participants, whereas performance-avoidance goals undermined intrinsic motivation. In another study with French children, Cury and colleagues (Cury, Fonséca, Rufo, Peres, & Sarrazin, 2003) examined the effect of achievement goals in students' investment in learning (e.g., time taken by pupils to prepare for tests) in physical education classes. They found that students endorsing performance avoidance goals reported higher states of anxiety and lower competence valuation than those endorsing mastery goals and performance-approach goals. Additionally, the study of Agbuga and Xiang (2008) provided empirical support for this model in the context of secondary school physical education in Turkey. Students ($N = 229$), in 8th and 11th grade, completed a series of questionnaires designed to assess their achievement goals and persistence/effort in physical education classes. The results of this study revealed that mastery goals and performance-approach goals emerged as significant positive predictors of students' persistence/effort.

To assess three achievement goals proposed in the trichotomous model in university academic settings, Elliot and Church (1997) developed the Trichotomous Achievement Goal Scale (TAGS; see Appendix C). The TAGS consists of 18 items on a 7-point Likert scale ranging from 1 (*not at all true of me*) to 7 (*very true of me*), with three items assessing each of the three goals. "I want to learn as much as possible form this class," "It is important to me to do better than the other student," and "I wish this class was not graded," are examples for assessing mastery goals, performance-approach goals, and performance-avoidance goals, respectively. The results from exploratory factor analysis indicated that these three achievement goals were

distinguishable among college students. The scores of the three achievement goals were also reliable (Cronbach's α = .89, 91, and .77, respectively).

The TAGS was slightly revised by Elliot in 1999. Specifically, the item "I wish this class was not graded." that assessed the performance-avoidance goal was replace by a new item "My goal for this class is to avoid performing poorly." Elliot reported that the revised TAGS demonstrated better psychometrics than the original TAGS.

Researchers in sports, physical education, and physical activity settings have adapted the TAGS (Elliot, 1997; Elliot & Church, 1997) to examine the trichotomous model in relation to students' outcomes. For example, the TAGS was adapted by Cury (1999) in a study to assess French high school students' achievement goals in physical education classes. It consisted of 15 items with responses on a 5-point Likert scale ranging from 1 (*don't agree at all*) to 5 (*completely agree*). Examples for assessing mastery goal, performance-approach goal, and performance-avoidance goal included "I want to learn as much as possible," "It is important for me to do better than the others," "I try to not make mistake because I don't want to be taken for a weak person." Subsequent research work demonstrated that the adapted TAGS provided a reliable and valid measure of the trichotomous model (Cury, Elliot, Sarrazin, Fonseca, & Rufo, 2002; Guan, Xiang, McBride, & Bruene, 2006).

1.1.3 A 2 × 2 Achievement Goal Model

As described earlier, the mastery goal in the trichotomous model is still portrayed as a unitary approach orientation. Given this, Elliot and McGregor (2001) proposed a theoretical 2 × 2 achievement goal model in which the mastery goal, similar to the performance goal that is bisected into performance-approach and performance-avoidance in the trichotomous model,

needs to be separated into mastery-approach and mastery-avoidance to account for the broad spectrum of competence-based desires or strivings. The four achievement goals (mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance) in the 2 × 2 achievement goal model are theorized to be distinct based on two fundamental dimensions of competence: definition and valence. Definition refers to how competence is defined in terms of the referent or standard that is used in performance evaluation, while valence concerns how competence is valenced. Specifically, competence can be defined in absolute, intrapersonal, and normative. Competence may be evaluated, and therefore defined, according to whether one has acquired understanding or mastered a task (absolute), improved one's performance or fully developed one's knowledge or skills (intrapersonal), or performed better than others (normative). Additionally, competence is valenced in that it is either construed in terms of positive possibility (e.g., success) or negative possibility (e.g., failure). For instance, mastery-approach goals focus on achieving task-based absolute/intrapersonal competence. They have objectives related to skill development, task mastery, and self-improvement. Mastery-avoidance goals focus on avoiding task-based absolute/intrapersonal incompetence. Students with such goals aim to avoid not learning or not completing a task. Performance-approach goals focus on normative competence, with the objective to outperform others, perform with, or show others that you are better. Performance-avoidance goals focus on avoiding normative incompetence and aiming to avoid losing or performing badly compared to others.

Research has provided empirical support for the 2 × 2 achievement goal model and showed that approach and avoidance goals contribute meaningful ways to understand different student outcomes in both academic and physical education/PA settings. For example, Finney, Pieper, and Barron (2004) investigated the influence of achievement goals on semester grade

point averages (GPA) among freshman students in a general academic context. They found that mastery-approach goals were a significant positive predictor of semester GPA, whereas performance-avoidance goals were a significant negative predictor. In addition to studies examining relationships between achievement goals and variables affecting learning and performance (Elliot & McGregor, 2001; Pieper, 2003), a recent study by Radosevich, Allyn, and Yun (2007) revealed that four achievement goals were linked to differential motivational patterns and educational outcomes in undergraduate business courses. Specifically, mastery-approach goals were associated with self-efficacy and self-set goals; mastery-avoidance goals were negatively related to self-efficacy; performance-approach goals had positive relationships with self-efficacy and self-set goals; and performance-avoidance goals were associated with decreased self-efficacy and performance (i.e., final grade).

Similarly, in physical education settings with college students, mastery-approach goals have been consistently found to be associated with adaptive outcomes (e.g., perceived competence, intrinsic regulation, and effort/persistence), and mastery-avoidance and performance-avoidance goals were reported to be correlated with maladaptive results, such as less practice, self-handicapping, and fear of failure (Chen, Wu, Kee, Lin, & Shui, 2009; Gao et al., 2012; Ntoumanis, Thøgersen-Ntoumani, & Smith, 2009). In middle school physical education, Garn and Sun (2009) examined the influence of 2 × 2 achievement goals on students' preparation effort for and performance on the Progressive Aerobic Cardiovascular Endurance Run (PACER). They found that mastery-approach goals were positive predictors of students' reported effort and PACER performance. Performance-approach goals positively predicted PACER performance only. Inversely, mastery-avoidance and performance-avoidance goals negatively predicted the PACER performance. Mastery-avoidance, performance-approach, and

performance avoidance goals did not emerge as significant predictors of students' reported effort.

Wang, Biddle, and Elliot (2007) examined achievement goals and their links to various psychological characteristics and outcomes in a physical education context with a sample of youth aged 11-18 years from Singapore. Cluster analysis was utilized to identify intraindividual achievement goal profiles, which were then examined in relation to outcomes (e.g., enjoyment, effort, boredom, and physical activity participation). The analysis identified four respective achievement goal clusters: moderate achievement goals, low achievement goals, high achievement goals, and mastery achievement goals. The "high achievement goals" cluster was found to positively link to relatedness, perceived competence, and enjoyment of physical activities, while the "low achievement goals" cluster was found to negatively link to them.

It is important to note that findings regarding performance-approach goals among college students are still not clear cutting in the 2 × 2 achievement goal model literature in physical education. Chen et al. (2009) reported that performance-approach goals negatively predicted self-handicapping behaviors such as making excuses and reducing effort. Conversely, Ntoumanis et al. (2009) observed that this goal positively predicted perceived competence. More recently, Gao and his colleagues (2012) found that performance-approach goals positively predicted intrinsic regulation and persistence/effort in physical activity classes. The inconsistencies in these findings call for future research to further determine the nature of the performance-approach goals in predicting college students' outcomes in physical education/PA settings.

To assess the 2 × 2 achievement goal model in college classroom settings, Elliot and McGregor (2001) developed a 2 × 2 Achievement Goal Questionnaire (AGQ; see Appendix D). The AGQ consisted of 12 items with three items assessing each of the four goals: mastery-

approach (e.g., “I want to learn as much as possible from this class.”), mastery-avoidance (e.g., “I worry that I may not learn all that I possibly could in this class.”), performance-approach (e.g., “It is important for me to do better than other students.”), and performance-avoidance (e.g., “I just want to avoid doing poorly in this class.”). Participants respond to all items on a 7-point Likert scale ranging from 1 (*not at all true of me*) to 7 (*very true of me*). It is important to note that 9 of the 12 items in AGQ came from the TAGS assessing the trichotomous achievement goal model (Elliot, 1999; Elliot & Church, 1997). Result of exploratory factor analysis, confirmatory factor analysis and Cronbach’s alphas analysis revealed that the AGQ was an acceptable measure of the 2 × 2 achievement goal model. Seven years later, with a sample of 229 undergraduates, Elliot and Murayama (2008) revised the AGQ and labeled it AGQ-R (see Appendix E). This is because they identified a number of measurement problems in AGQ, including some items failing to assess goals, combining together the goal and the motivation underlying the goal, and providing content that is applicable to different goals. For example, Elliot and Murayama pointed out, “the prefixes of some AGQ items seem to suggest a value (e.g., “It is important for me to do better than other students”) or a concern (e.g., “I worry that I may not learn all that I possibly could in this class”), rather than a goal per se.” (p. 614). As a result, these problematic prefixes were replaced with “My goal is to…,” “My aim is to…,” and “I am striving to….” Results of confirmatory factor analyses and Cronbach’s alphas provided strong evidence of validity and reliability for the AGQ-R, suggesting that this measure can reliably and validly assess the 2 × 2 achievement goal model in college classrooms.

Measures that assessed the 2 × 2 achievement goal model in physical education/PA settings are primarily adapted from the AGQ. For example, Guan, McBride and Xiang (2007) adapted and validated the AGQ with two samples of high school students in physical education.

They added the stem "In my PE class…" to situate all 12 items of AGQ in the context of physical education classes that participating students were taking at the time they completed the AGQ. Results of both reliability and validity analyses provided empirical evidence that the revised AGQ (see Appendix E) can be a reliable and valid measure of the 2 × 2 achievement goal model in high school PE settings.

1.1.4 A 3 × 2 Achievement Goal Model

In 2011, Elliot and colleagues expanded the 2 × 2 achievement goal model into a 3 × 2 goal model (Elliot, Murayama, & Pekrun, 2011). Given that competence can be defined in three distinct standards: task, self, and other (i.e., definition of competence), they argued that the mastery-based goals in the 2 × 2 achievement goal model embrace both task- and self-based competence and thus should be differentiated into task-based and self-based goals. As a result, they proposed the 3 × 2 goal model with the definition of competence (task/self/other) fully crossing with the valence of competence (positive/negative). The six goals in this model are: task-approach which focuses on attaining task-based competence (e.g., doing the activity the way it was designed to be done), task-avoidance which attempts to avoid task-based incompetence (e.g., not failing to do the activity the way it was designed to be done), self-approach which concentrates on self-based competence (e.g., doing better than before), self-avoidance which concerns about self-based incompetence (e.g., not doing worse than before), other-approach which focuses on attaining other-based competence (e.g., doing better than others), and other-avoidance which strives to avoid other-based incompetence (e.g., not doing worse than others). Theoretically, the 3 × 2 model should provide more differential power in explaining student

motivation and related cognitive, affective, and behavioral outcomes in college settings (Elliot et al., 2011; Johnson & Kestler, 2013).

To date, a few studies have provided evidence to support the 3 × 2 goal model in the academic and physical activity settings (Elliot et al., 2011; Johnson & Kestler, 2013; Lower & Turner, 2016; Mascret, Elliot, & Cury, 2015; Wang, Liu, Sun, & Chua, 2017; Wu, 2012). For example, in a study with college students from Germany and the United States (Elliot et al., 2011), confirmatory factor analyses revealed that the 3 × 2 goal model displayed a greater data fit than any of 10 other alternative goal models (e.g., dichotomous model, trichotomous model, 2 × 2 model, definition model, and valence model). Additionally, task-approach goals were found positively related to intrinsic motivation, learning efficacy, and absorption in class, whereas self-approach goals were found unrelated and other-avoidance goals were found negatively related to these outcomes. Similarly, Johnson and Kestler (2013) examined the 3 × 2 goal model among traditional and nontraditional college students. They reported that only other-avoidance goals were found to negatively predict students' academic achievement (assessed via cumulative GPA).

In physical education and sport settings, there is only one study that examined the 3 × 2 goal model and its relation to entity and incremental theories of ability, perceived competence, and intrinsic interest among French undergraduate students (Mascret, Elliot, & Cury, 2015). Results of this study showed that task-based and self-based goals were differentially associated with conceptions of athletic ability, perceived competence, and interest. More specifically, other approach goals and other-avoidance goals were positively related to entity theory, whereas task-approach goals and self-approach goals were positively related to incremental theory. In addition, task-approach goals and other-approach goals were shown positively predicting

perceived competence, while task-approach goals and self-approach goals were found positively predicting intrinsic interest.

To assess the 3 × 2 achievement goal model, Elliot, Murayama, and Pekrun (2011) developed a 3 × 2 achievement goal questionnaire, labeled the 3 × 2 AGQ (see Appendix F), based on the data provided by college students in both Germany and the United States (U.S.). The 3 × 2 AGQ consisted of 18 items, all of which focused explicitly on the task of taking an exam for a particular course, psychology. Participants were asked to respond to all items on a 7-point Likert scale ranging from 1 (*not true of me*) to 7 (*extremely true of me*). Results of confirmatory factor analyses (CFAs) strongly supported the construct validity of the 3 × 2 AGQ among this sample of college students. In addition, Cronbach's alpha coefficients for scores of the six achievement goals ranged from .77 to .93 for the German sample and .83 to .92 for the U.S. sample. In a more recent study with a sample of elementary school and eighth grade junior high school students, Wu (2012) reported that the 3 × 2 AGQ provided more valid scores than the measures of the dichotomous, trichotomous, and 2 × 2 models.

Building on the Elliot et al. study (2011), Ning (2016) utilized the 3 × 2 AGQ to examine achievement goals and related learning outcomes (e.g., deep and surface learning strategies, help-seeking strategies, academic performance, and prior academic achievement) among Hong Kong first-year undergraduate students in an educational setting. Results of CFAs provided strong support for the construct validity of the 3 × 2 AGQ. High levels of internal consistencies were also observed for the six achievement goal scores as Cronbach's alphas of those scores ranged from .85 to .94. Multiple regression analyses showed that task-approach goals positively predicted a deep learning strategy of relating ideas and instrumental help-seeking. Self-approach goals positively predicted a deep learning strategy of understanding for oneself, while other-

approach goals and other-avoidance goals emerged as a positive and a negative predictor of students' academic performance, respectively. Other-avoidance goals also served as a positive predictor of the surface learning strategy of unreflective study.

The 3 × 2 AGQ has been adapted to examine student achievement goals in a context of sport with a sample of French undergraduate students (Mascret et al, 2015). Similar to the Elliot et al. study (2011), this work tested whether the 3 × 2 AGQ, when adapted to a sports setting (see Appendix G), would demonstrate a better model fit than any of 10 other alternative achievement goal models (i.e., dichotomous model, trichotomous model, 2 × 2 model, task-approach/task-avoidance model, self-approach/self-avoidance model, other-approach/other-avoidance model, approach model, avoidance model, definition model, and valence model). Results of CFAs and reliability analyses supported Elliot et al. (2011) that, compared to 10 other goal models, the data provided by the revised 3 × 2 AGQ displayed a better model fit and thus the revised 3 × 2 AGQ was proven as a reliable and valid measure to assess the 3 × 2 goal model in the domain of sports.

To date, there has been empirical research evidence to support the 3 × 2 goal model in understanding student motivation and related outcomes in academic and sport settings (e.g., Elliot et al., 2011; Mascret et al., 2015; Ning, 2016; Wang et al., 2017). This model, however, has not been examined among American college students in PA settings. Consequently, its utility in understanding and explaining college students' motivation for PA participation is unknown.

1.2 Self-Determination Theory

Initially developed by Deci and Ryan (1985, 1991), self-determination theory (SDT) addresses the degree to which motivation is deemed internal and how self-determination

influences the selection of actions and resulting desired motivational outcomes. Self-determined motivation refers to the process of making things happen in one's own life. SDT provides an explanation for human motivation through the interaction among individuals' innate tendencies toward psychological integration and specific aspects of environment.

Central to the theory is the distinction between two forms of motivation, autonomous and controlled. Autonomous motivation drives people to volitionally engage in activities because they perceive these activities as either interesting or enjoyable. As opposed to autonomous motivation, controlled motivation refers to motivated behaviors for activities that individuals are coerced to undertake due to interpersonal psychological pressuring. The individuals may feel obligated to get involved in activities because of possible rewards, punishment, and a sense of internal or external compulsion. The important point in this distinction is that both autonomous and controlled behaviors are motivated or intentional but their regulatory processes are very different.

To explain those regulatory processes, SDT proposed a notion of motivational regulation and contended that motivational regulations reflect individuals' rationales or reasons for engaging in tasks and are driven by perceptions as to whether the behavior will serve an individual's psychological needs, such as autonomy, competence, and relatedness. The three needs are conceived as essential and universal nutriments to psychological health and the development of internal motivation. First, the need for autonomy refers to individuals' need to have a voice and make choices in their learning. Second, the need for competence refers to individuals' need to be able to successfully accomplish learning activities. Third, the need for relatedness deals with the desire to seek and develop secure and connected relationships with others in one's social context. In SDT, motivational regulations are conceptualized as a

continuum ranging from amotivation, to extrinsic regulations to intrinsic regulation; ranging from the most controlling to the most autonomous forms of motivation.

1.2.1 Six Motivational Regulations

As the first regulation described in SDT, amotivation is defined as a state in which people lack the intention to behave or act and thus have insufficient motivation. Amotivated individuals typically feel incompetent, display expectancies of uncontrollability and perform activities without purpose.

The second regulation is extrinsic motivation. It is characterized by an individual's goal of action being governed by some separable consequences. Extrinsic motivation includes external regulation, introjected regulation, identified regulation, and integrated regulation. On the self-determination continuum, these regulations represent low to high levels of self-determination or autonomy. External regulation represents the most controlled form of extrinsic regulation as well as the lowest degree of self-determined motivation. The external regulation occurs if an activity is done because of external factors like rewards, incentives or fear of punishment. For example, students may participate in physical activities in order to get free T-shirts or to avoid punishment. Introjected regulation is a somewhat less controlled form of extrinsic regulation, which is influenced by esteem-based pressures to act, such as avoidance of guilt and shame or concerns about self- or other approval. For example, some students may participate in physical activities in order not to let their parents down. Identified regulation and integrated regulation represent more autonomous extrinsic motivation (Deci & Ryan, 1985, 2002). The identified regulation occurs when the individual has recognized and accepted the underlying values or goals of behavior. The identified regulation is the lower boundary of

autonomous regulation that motivates action because of the personal importance attached to outcomes stemming from participation. The integrated regulation is the most internalized form of extrinsic regulation. It means the identification of the importance of behaviors, but also integrates those identifications with other aspects of the self. The integrated regulation exists when people have fully accepted the identified behaviors by bringing them into harmony or coherence with other aspects of their goals and values (Ryan & Deci, 2000).

At the self-determined apex of the continuum is intrinsic regulation, which is characterized by a high degree of autonomy. Intrinsic regulation is considered the most autonomous motivation and refers to engaging in an activity due to the pleasure, fun, interest, and satisfaction derived from participation. For example, some students who run because they enjoy the sensation in their muscles at the end of a long run would be described as intrinsically motivated. Ryan and Deci (2000) suggested that intrinsic regulation underpins prolonged task persistence and promotes psychological health and well-being, while amotivation is associated with behavioral disengagement and psychological maladies.

It is important to note that, in SDT research, self-determined motivation has been used as a term to describe the process by which behavior becomes relatively more autonomously regulated. Same as to autonomous motivation, self-determined motivation includes identified regulation, integrated regulation, and intrinsic regulation. Therefore, the two terms (autonomous motivation and self-determined motivation) will be used interchangeably in the reminder of this review.

1.2.2 Research on Motivational Regulations and Achievement/Educational Outcomes

There is considerable research work examining relationships between motivational regulations and achievement/educational outcomes in a variety of settings (Ryan, Mims, & Koestner, 1983; Vallerand, Fortier, & Guay, 1997), including physical education and physical activity settings (e.g., Ntoumanis, 2005; Soenens & Vansteenkiste, 2005; Standage & Ryan, 2012). The outcomes examined in this work include students' level of achievement (Burton, Lydon, D'Alessandro, & Koestner, 2006; Miserandino, 1996), coping style (Ryan & Connell, 1989), preference for optimal challenges (Boggiano, Main, & Katz, 1988), creativity (Amabile, 1985), well-being or psychological health (Levesque, Zuehlke, Stanek, & Ryan, 2004; Roth, 2008), persistence for a class (Vallerand & Blssonnette, 1992) and for school (Vallerand, Fortier, & Guay, 1997), intention of being physically active or playing sports in the future (Ntoumanis, 2001; Standage, Duda, & Ntoumanis, 2003), and lower rates of boredom (Ntoumanis, 2001, 2002). Empirical data support the differential roles of motivational regulations in predicting students' achievement/educational outcomes and reveal that autonomous motivation (e.g., intrinsic regulation, integrated regulation, and identified regulation) tend to positively relate to achievement/educational outcomes more than controlled motivation (e.g., introjected regulation, external regulation, and amotivation).

More specifically, research by Grolnick and Ryan (1987) in a classroom setting revealed that elementary students who reported more autonomous motivation for learning, in general, displayed greater conceptual learning and better memory than did students who reported less autonomous motivation. Gottfried (1985, 1990) observed similar results. His experimental research among young elementary school students showed that more autonomously motivated children demonstrated more positive coping, higher achievement, and better adjustment.

However, in some studies, autonomous motivation was not found to be significantly correlated with achievement in elementary school populations (Baker & Wigfield, 1999; Guthrie et al., 1996).

With regards to adolescents and older student populations, Nishimura and Sakurai (2013) reported that high autonomous motivation and low controlled regulation were strongly related to academic adjustment, performance, and competence in a sample of junior high school students. Black and Deci (2000) examined the influence of university students' autonomous motivation on adjustment and academic performance in an organic chemistry course. They reported that autonomous motivation was positively correlated with educational outcomes, such as higher perceived competence and interest/enjoyment. Similar results were found in the context of first compulsory French course with junior college students (Vallerand & Blssonnette, 1992). Students who persisted in the course were significantly more autonomous at the beginning of the semester than were students who dropped out of the course. In general, autonomous motivation is critical for positive psychological and educational outcomes among students from junior high to university.

Although research in physical education/PA and sport domains has been less prolific than classroom research, a growing number of studies have confirmed similar results observed in classroom settings. In a sample of French high school students, Boiché, Sarrazin, Grouzet, Pelletier, and Chanal (2008) reported that self-determined motivation (i.e., high scored intrinsic regulation, identified regulation) led to higher levels of achievement, while external regulation and amotivation were associated with lower levels of performance. Vallerand and colleagues (1999) examined the influence of university students' motivation on educational outcomes in the context of sports. They found that self-determined motivation was more likely to lead to positive

cognitive (e.g., high concentration), affective (e.g., enjoyment), and behavioral (e.g., persistence) outcomes than controlled motivation and amotivation. Li (1999) also found that higher levels of intrinsic regulation, integrated regulation, and identified regulations were significantly and positively related to exercise effort and interest in a sample of 598 university students enrolled in a variety of physical classes (e.g., weight training, aerobics, swimming). Similarly, Ntoumanis (2001, 2005) reported that intrinsic regulation was associated with better effort and greater intention of being physically active in after-school activities among adolescents and university students. Additionally, identified regulation was found to be associated with adaptive or desirable outcomes and students with amotivation reported boredom, low level of participation, and lack of intention to participate in after-school physical activities. Daley and Duda (2006) investigated whether stages of change for exercise and physical activity patterns varied as a function of motivational regulations in a sample of university students in England. They found that male and female students who scored higher on identified and intrinsic regulations were more likely to be in the stages of maintenance and/or action and to be physically active than their counterparts who scored lower on the two regulations.

Clearly, findings from these studies indicated that high levels of self-determined motivation (i.e., intrinsic regulation, integrated regulation, and identified regulation) were associated with increased effort/persistence, positive attitudes toward physical activities, better performance, and enhanced psychological well-being. In contrast, less or non self-determined motivation (i.e., introjected regulation, external regulation, and amotivation) predicted negative outcomes, including lower level of effort/persistence, boredom, and less or no intention to participate in physical activity.

1.2.3 Measures of Motivational Regulations in Physical Activity/Physical Education Settings

A number of measures have been developed to measure individuals' motivational regulations in classroom and physical activity/physical education settings. In classroom settings, the most often used measure is Academic Motivation Scale (AMS; Vallerand et al., 1992, 1993). In physical activity/ physical education settings, researchers have used Behavioral Regulation in Exercise Questionnaire (BREQ; Mullan, Markland, & Ingledew, 1997), BREQ-2 (Markland &Tobin, 2004), BREQ-3 (Wilson et al., 2006), Exercise Motivation Scale (EMS; Li, 1999), Self-Regulation Questionnaire (SRQ; Brown, Miller, & Lawendowski, 1999), Exercise SRQ (SRQ-E; Ryan & Connell, 1989), and Sport Motivation Scale (SMS; Pelletier, Tuson, Fortier, Vallerand, Briere, & Blais, 1995). This review focuses on BREQ, BREQ-2, and BREQ-3 as they have been most widely used in physical activity/physical education settings.

1.2.3.1 BREQ

Mullan and colleagues (1997) developed BREQ with a diverse sample of 298 sport-center attendees and workers in Great Britain. It included four scales: external regulation, which was measured by four items (e.g., "I take part in exercise because my friends/family/spouse say I should."), introjected regulation, which was measure by three items (e.g., "I feel ashamed when I miss an exercise session."), identified regulation, which was measured by four items (e.g., "I think it is important to make the effort to exercise regularly."), and intrinsic regulation, which was measured by four items (e.g., I find exercise a pleasurable activity."). Respondents completed the 15-item BREQ on a 5-point Likert scale ranging from 0 (*not true for me*) to 4 (*very true for me*). The four-factor model demonstrated acceptable discriminant validity and

internal consistency. Specifically, the BREQ discriminated between individuals at different stages of change for exercise, with those in the later stages being more self-determined in their behavioral regulation than those in the earlier stages. Wilson, Roders, and Fraser (2002) supported the factorial and convergent validity of the BREQ with a sample of Canadian university students and staff who enrolled in exercise classes.

It is important to note amotivation and integrated regulation were not measured in BREQ. Consequently, Markland and Tobin (2004) made an attempt to revise BREQ and labeled it BREQ-2.

1.2.3.2 BREQ-2

The BREQ-2 not only retained the four scales of BREQ but also added four items to measure amotivation, resulting in a total of 19 items. An example item for amotivation is "I don't see why I should have to exercise." A total of 194 participants (previously enrolled in an exercise referral scheme in the UK) complete the BREQ-2 on a 5-point Likert scale ranging from 0 (*not true for me*) to 4 (*very true for me*). Results of the confirmatory factor analysis indicated that the BREQ-2 had strong factorial validity and thus could be utilized by researchers to measure amotivation along with external regulation, introjected regulation, identified regulation, and intrinsic regulation in physical activity settings. Research with North American samples also supported the factorial validity of BREQ-2 (Duncan, Hall, Wilson, & Jenny, 2010; Ingledew, Markland, & Ferguson, 2009; Russell & Bray, 2009; Wilson, Rodgers, Fraser, & Murray, 2004) and its ability to differentiate between physically active and inactive groups (Landry & Solomon, 2004).

Thus far, the BREQ-2 has become the most often used measure of motivational regulations and demonstrated good factorial validity and reliability with diverse populations (e.g., the British, Canadian, American, the Greeks, Australian, and Spanish). Even so, some critical issues have recently been identified. For example, several studies (Chung & Liu, 2012; Gaston, Wilson, Mack, Elliot, & Prapavessis, 2013; Markland & Tobin, 2004) examined the psychometric properties of the BREQ-2 in different languages (e.g., traditional Chinese, Portuguese, Dutch, French, Italian, Norwegian, and Spanish) but failed to confirm its discriminant validity as demonstrated previously (Chung & Liu, 2012; Liu, Chung, Zhang, & Si, 2015; Markland & Tobin, 2004). Additionally, among the four items that assessed identified regulation, one item (I get restless if I don't exercise regularly) was found problematic (Chung & Liu, 2012; Liu, Chung, Zhang, & Si, 2015; Markland & Tobin, 2014; Moustaka, Vlachopoulos, Vazou, Kaperoni, & Markland, 2010; Murcia, Gimeno, & Camacho, 2007). Like the BREQ, BREQ-2 failed to consider integrated regulation, the most self-determined form of extrinsic motivation delineated in SDT (Deci & Ryan, 1985, 2002). Pelletier and colleagues (Pelletier, Dion, Slovinec-D'Angelo, & Reid, 2004) argued that integrated regulation was found to be associated with healthier eating patterns in their study with a sample of 343 female students. To address this argument, Wilson, Rodgers, Loitz, and Scime (2006) expanded BREQ-2 to include a measure of integrated regulation and labeled it BREQ-3.

1.2.3.3 BREQ-3

The integrated regulation measure in BREQ-3 consists of four items: I exercise because it is consistent with my life goals; I consider exercise part of my identity; I consider exercise a fundamental part of who I am; and I consider exercise consistent with my values. Same as BREQ

and BREQ-2, participants respond to all items of BREQ-3 on a 5-point Likert scale ranging from 0 (*not true for me*) to 4 (*very true for me*). Wilson and colleagues (2006) reported that the integrated regulation items appeared to be structurally distinct from items of other regulations, which is consistent with SDT's notion of a regulatory continuum. In addition, a few studies examined the factorial validity of the other language versions of the BREQ-3. For example, González, Sicilia, and Fernández (2010) revealed acceptable fit indices in the confirmatory factor analysis and good internal consistency in the Spanish language version. Specifically, this study obtained Cronbach's alpha coefficients of .87 for intrinsic regulation, .87 for integrated regulation, .66 for identified regulation, .72 for introjected regulation, .78 for external regulation, and .70 for amotivation.

It is important to note that research focusing on motivational regulations in physical education/PA has rarely assessed integrated regulation. Clearly, there is a need for future research to include this regulation so a more complete picture of motivational regulations in predicting student achievement/educational outcomes can be acquired. With such information, instructors might have a better chance to provide quality physical activity programs that will maintain strong and consistent participation levels among students during university years. To this end, BREQ-3 will be used to assess motivational regulations in the present study.

1.3 Links between Achievement Goals and Motivational Regulations

Considering the view that achievement goal theory (AGT) and SDT can be complementary in the examination of student motivation and related cognitive, affective, and behavioral outcomes (Ryan & Deci, 2000), researchers have investigated theoretical links between achievement goals and motivation regulations in physical education/PA settings

(Conroy, Kaye, & Coatsworth, 2006; Moreno et al., 2010; Shih, 2008; Su, McBride, & Xiang, 2015). Theoretical and empirical evidence has indicated that achievement goals are linked to different types of motivational regulation (Conroy, Elliot, & Coatsworth, 2007; Moreno et al., 2010; Shih, 2008).

Research in the exercise context has shown that individuals who attach high value to mastery goals tend to have more autonomous motivations and, in particular, report high levels of intrinsic motivation in tasks (Brunel, 1996; Hein & Hagger, 2007; Newton & Duda, 1999; Ntoumanis, 2001 Wang & Biddle, 2003). For example, Ntoumanis (2001) examined the dichotomous achievement goal model (mastery goals and performance goals) in relation to motivational regulations among British college students (N = 247) in sport. The dichotomous achievement goals were measured with the Task and Ego Orientation in Sport Questionnaire (TEOSQ). The researcher found that mastery goals (i.e., task orientation) positively predicted intrinsic regulation and identified regulation, while performance goals (i.e., ego orientation) positively predicted introjected regulation, external regulation, and intrinsic regulation.

Different from Ntoumanis (2001), Barkoukis, Ntoumanis, and Nikitaras (2007) examined the trichotomous achievement goal model (mastery goal, performance-approach goal, and performance-avoidance goal) and its relations to motivational regulations among 336 Greek adolescents in a summer sports camp. They reported that mastery goals positively predicted intrinsic and identified regulations and negatively predicted external regulation. They also found that performance-approach goals positively predicted identified regulation and introjected regulation, while performance-avoidance goals positively predicted identified regulation, introjected regulation, and external regulation. It is important to note that this is the only study

that focused on the relationship between the trichotomous goal model and motivational regulations in physical education/PA settings.

Gao, Podlog, and Harrison (2012) moved to examine the 2 × 2 achievement goal model (mastery-approach goal, mastery-avoidance goal, performance-approach goal, and performance-avoidance goal) in relation to motivational regulations and effort/persistence of 249 students in college PA classes. Multiple regression analyses revealed mastery-approach and performance-approach goals emerged as positive predictors of intrinsic regulation; only mastery-approach goals positively predicted identified regulation; mastery-approach goals were negatively related to amotivation; performance-approach and performance-avoidance goals were positively related to amotivation; and mastery-approach goals, performance-approach goals, intrinsic regulation, and identified regulation positively predicted students' effort/persistence in PA. Building on Gao et al. work, Su, McBride and Xiang (2015) utilized structural equation modeling to investigate relationships between achievement goals and motivational regulations among 361 students in college PA classes. Their findings are consistent with those reported by Gao et al. that mastery-approach goals positively predicted intrinsic and identified regulations, while performance-approach goals and mastery-avoidance goals emerged as positive predictors of introjected and external regulations.

As reviewed earlier, the achievement goal models have advanced to the 3 × 2 achievement goal model (task-approach goal, task-avoidance goal, self-approach goal, self-avoidance goal, other-approach goal, and other-avoidance goal). However, the research work reviewed above focused on the dichotomous, trichotomous, and 2 × 2 models in relation to motivational regulations. Additionally, none of the work included integrated regulation, the most internalized form of extrinsic regulation. Considered together, there is a need to expand this line

of research by examining the 3 × 2 achievement goal model in relation to all motivational regulations depicted in SDT. Such an inquiry can provide us a more complete picture of how achievement goals are related to motivational regulations, which will further our understanding of what motivates students in college PA settings.

1.4 Mediation of Motivational Regulations

A mediator is referred to as a variable that explains the relationship between an independent variable and a dependent variable (e.g., Baron & Kenny, 1986). It can address "how" and "why" the independent variable predicts or influences the dependent variable (Frazier, Tix, & Barron, 2004). Therefore, to better understand relationships between independent variables and dependent variables, researchers need to examine their mediators, or mediation effects. Frazier and colleagues (2004) argued that examining the presence of mediators in relationships among variables can advance theory, research, and practice in the field of counseling psychology. In physical education, Agbuga, Xiang, McBride and Su (2016) agreed that identification of important mediators of relationships reflects the maturity and sophistication of a field of research or discipline.

Given the importance of mediators in understanding relationships among variables, some researchers have examined whether motivational regulations mediated relationships between achievement goals and important achievement/educational outcomes. With a sample of 732 Hungary school students ages 12-16, Biddle and colleagues (1999) reported that intrinsic and identified regulations mediated the effect of task orientation (i.e., mastery goal) on students' intention to participate in sport in the near future. Georgiadis et al. (2001) sampled 350 Greek adults (mean age = 38 years) who were active exercisers in a study examining relationships

among achievement goals, motivational regulations and physical self-worth. They observed similar results. That is, intrinsic and identified regulations emerged as mediators of the relationship between task orientation and physical self-worth and the relationship between ego (i.e., performance goal) and physical self-worth. However, the work reviewed here was exclusively guided by the dichotomous achievement goal model. Consequently, no information is available concerning mediation effects of motivational regulations in the trichotomous, 2 × 2, and 3 × 2 goal models. This is a gap that needs to be addressed in research on student motivation for participation in physical activity/physical education.

1.5 Achievement and Educational Outcomes

The achievement and educational outcomes reviewed in this section specifically refer to persistence/effort, enjoyment, perceived health, and physical activity. They served as dependent variables in this study because they represent outcomes that students are expected to achieve in education (Black & Deci, 2000; Gao et al., 2012; Guan et al., 2006; McBride, Altunsöz, Su, Xiang, & Demirhan, 2016) and because they have been considered important consequences of motivation in the literature (Duda, 1992; Dweck & Leggett, 1988; Eccles 1983; Xiang, Lee, & Solmon, 1997).

Persistence is defined as a continued investment in learning in the face of difficulty, whereas effort uses the overall amount of energy or work expended over the course of learning (Pintrich, Smith, Garcia, & Mckeachie, 1993; Zimmerman & Risemberg, 1997). Greater persistence/effort is associated with better academic performance and achievement (e.g., Renaud- Dubé, Guay, Talbot, Taylor, & Koestner, 2015). A number of studies have examined persistence/effort in relation to achievement goals and/or motivational regulations in academic

and physical educational settings (Agbuga & Xiang, 2008; Dweck, 1986; Elliot & Harackiewicz, 1996; Gao et al., 2012; Guan et al., 2006; Ntoumanis, 2001; Xiang & Lee, 2002). In general, results of this work revealed that mastery-approach and performance-approach goals positively predicted students' persistence/effort. In addition, identified regulation and intrinsic regulation emerged as positive predictors of persistence/effort.

Enjoyment is defined as the act or condition of taking pleasure or satisfaction from physical education and physical activity settings (Fairclough, 2003). It is a main motivator for learning new skills and sustained involvement in classes (e.g., Scanlan, Simons, Carpenter, Schmidt, & Keeler, 1993) and relates to physical activity behaviors (e.g., Cox, Smith, & Williams, 2008). Empirical studies have documented that autonomous motivation and mastery-approach goals positively predicted enjoyment (Black & Deci, 2000; Lee, Sheldon, Turban, 2003).

Perceived health is defined as how an individual perceives his/her health status (Shields & Shooshtari, 2001). Helping students stay healthy and feel good about themselves (i.e., perceived health) is an important outcome that any college physical activity class should strive for. As a result, McBride and Xiang (2013) focused on perceived health as an outcome in their examination of motivational regulations in college physical activity classes. They reported that autonomous motivation (i.e., intrinsic regulation, identified regulation) positively predicted perceived health among college students.

Physical activity is viewed as any bodily movement produced by skeletal muscles, which results in energy expenditure (Caspersen, Powell, & Christenson, 1985). It is considered necessary for improving physical and psychological well-being (Wallhead & Buckworth, 2004). Additionally, students' in-class physical activity has been identified as a cornerstone for the

evaluation of the effectiveness of the classes and therefore provides an index for achievement (Galuska & Fulton, 2009). Consequently, in-class physical activity was selected as an outcome variable in the present study. Empirical studies have shown that compared to less self-determined regulations (e.g., introjected regulation and external regulation), more self-determined regulations (e.g., identified regulation and intrinsic regulation) are more likely to positively predict moderate-intensity physical activity (Gillison, Standage, & Skevington, 2006; Standage, Sebire, & Loney, 2008; Wilson, Rodgers, Blanchard, & Gessell, 2003). However, there are no empirical data on a relationship between achievement goals and physical activity in college PA settings.

In summary, this chapter reviewed achievement goal theory with achievement goal models and self-determination theory with motivational regulations. The chapter also highlighted literature review on relationships among achievement goals, motivational regulations, and achievement/educational outcomes. The results from the literature review indicated that approach-goals and more self-determined regulations were positively related to achievement/educational outcomes. In addition, this chapter revealed a gap in knowledge about the mediation of motivational regulations in the relationship between achievement goals and achievement/educational outcomes.

CHAPTER II

THE PRESENT STUDY

2.1 Introduction

Regular participation in physical activity (PA) is critical to individuals' physical and psychological wellbeing (Caspersen, Powell, & Christenson, 1985; Marcus et al., 2000; Warburton, Nicol, & Bredin, 2006). Therefore, it is recommended that adults aged 18-64 participate in at least 150 minutes of moderate-intensity aerobic activity every week (Centers for Disease Control and Prevention [CDC], 2010; U.S. Department of Health & Human Services [USDHHS], 2008, 2010). Research evidence revealed that college students, as a whole, do not get the recommended amount of PA each week (USDHHS, 2008) and many of them are becoming less physically active as a consequence of prevalent sedentary living (Bell & Lee, 2005; Brown & Trost, 2003; Dai, Wang, & Morrison, 2014). Given that college students are at a critical age because their choice of physical activity can impact the rest of their lives, it is crucial to promote PA among them. To achieve this, researchers and practitioners must understand college students' motivation for PA participation.

Motivation is defined as the process of energization, direction, and regulation of behavior (Roberts, 2001). Achievement goal theory (Dweck, 1986; Elliott, 1983; Nicholls, 1989) and self-determination theory (Deci & Ryan, 1985, 1991; Ryan & Deci, 2000) represent two viable theories in understanding and explaining students' motivation and related achievement/educational outcomes in physical activity/physical education settings (Agbuga & Xiang, 2008; Shen et al., 2007; Wang et al., 2009). However, these two theories have rarely been examined simultaneously in research on college PA classes/programs. To gain a more complete

understanding of college students' motivation and related cognitive, affective, and behavioral outcomes in such settings, the present study utilized both achievement goal theory and self-determination theory as theoretical perspectives.

2.1.1 Achievement Goal Theory (AGT)

Achievement goals (AG) concern how individuals evaluate their personal competence in achievement settings and influence the ways they participate in and manage physical activity involvement (Pintrich & Schunk, 2002). For the last 30 years, achievement goal theory has evolved from the dichotomous model (mastery and performance goals) to a trichotomous model (mastery, performance-approach, and performance-avoidance goals), to a 2 × 2 model (mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance goals), to a 3 × 2 model (task-approach, task-avoidance, self-approach, self-avoidance, others-approach, and others-avoidance goals). This study utilized the 3 × 2 model as a theoretical framework because research in college academic settings showed that this model provided greater differential power in explaining student motivation and related cognitive (e.g., perceived competence), affective (e.g., enjoyment), and behavioral (e.g., persistence/effort) outcomes compared to the earlier models (Elliot et al., 2011).

In the 3 × 2 model, task-approach goals focus on attaining task-based competence (e.g., to accomplish the task correctly/right) while task-avoidance goals attempt to avoid task-based incompetence (e.g., to avoid doing the task incorrectly/wrong). Self-approach goals concentrate on self-based competence (e.g., to do better than before), whereas self-avoidance goals are concerned about self-based incompetence (e.g., to avoid doing worse than before). Finally, other-approach goals focus on attaining other-based competence (e.g., to do better than others), while

other-avoidance goals strive to avoid other-based incompetence (e.g., to avoid doing worse than others). Elliot et al. (2011) developed a18-item questionnaire, labeled the 3 × 2 Achievement Goal Questionnaire (3 × 2 AGQ), to assess these six achievement goals in a college academic setting and provided evidence to support the reliability and validity of the 3 × 2 AGQ. Subsequent studies yielded further evidence that the 3 × 2 AGQ provided a good fit among different populations in academic (Diseth, 2015; Ning, 2016) and sport settings (Lower & Turner, 2016; Mascret, Elliot, & Cury, 2015).

Research with college students revealed that task-approach goals positively predicted learning efficacy and absorption in psychology class (Elliot et al., 2011), and other-avoidance goals were negatively related to students' cumulative GPA (Johnson & Kestler, 2013). In PA settings, only one study examined the 3 × 2 model among French undergraduate students (Mascret, Elliot, & Cury, 2015). Findings revealed that only task-approach goals were positively related to perceived competence in sports. Apparently, the application of the 3 × 2 model in understanding American student motivation and related cognitive, affective, and behavioral outcomes in college PA settings needs to be researched. Prior to this line of inquiry, research work must be conducted to ensure that the 3 × 2 AGQ can reliably and validly measure the six achievement goals depicted in the 3 × 2 model in the context of college PA.

2.1.2 Self-Determination Theory (SDT)

The self-determination theory (Deci & Ryan, 1985, 1991) has been considered an important theoretical perspective for understanding and explaining individuals' motivations in a variety of settings due to its multidimensional conceptualization of intrinsic and extrinsic motivation. SDT proposes that motivational regulations exist as a continuum ranging from

amotivation to extrinsic regulations to intrinsic regulation (Ryan & Deci, 2000; Deci, Ryan, & Guay, 2013). Amotivation is a state akin to learned helplessness and involves a lack of intention to engage in a behavior. The four extrinsic regulations include external regulation, introjected regulation, identified regulation, and integrated regulation. Their levels of autonomy range from low to high, respectively.

First, external regulation is the most controlling form of extrinsic motivation outlined within SDT and involves participation in a behavior to satisfy an externally imposed demand or obtain an instrumental reward. Second, introjected regulation, the next pint along the regulatory continuum, motivates behavior through intrapsychic contingencies that impose sanctions centered on avoiding negative feelings, such as anxiety, guilt, or shame. Third, identified regulation represents the lower boundary of autonomous regulation, given that these motives recognize the personal importance and value associated with the benefits to be derived from the target behavior. Fourth, integrated regulation represents the most autonomous form of extrinsic motivation, occurring when congruence exists between behavioral regulations and personally endorsed values, goals, and needs that are already part of the self. Additionally, intrinsic regulation has the highest degree of autonomy. Intrinsic regulation involves participation in an activity because the activity itself is inherently interesting and satisfying. It is theorized that these motivational regulations represent different motives that define the reasons why individuals practice and sustain their participation in physical activity (Hellín, Moreno, & Rodríguez, 2004).

Empirical data support the differential roles of motivational regulations in students' achievement outcomes and revealed that more self-determined regulations (i.e., identified, integrated and intrinsic regulations) tended to positively relate to achievement outcomes more than controlled regulations (i.e., external and introjected regulations). For example, Ntoumanis

(2005) reported that only intrinsic and identified regulations were found to be positively related to increased effort/persistence, positive attitudes toward physical activities, better performance, and enhanced psychological well-being among college students in PA. Wilson and colleagues observed similar results with another sample of college students (Wilson et al., 2004). They reported that among the five motivational regulations, identified regulation emerged as the strongest predictor of behavioral intention to exercise, self-reported exercise behavior, and effort and importance for both men and women; introjected regulation positively predicted these outcomes for women only; and intrinsic regulation positively predicted effort and importance for both genders and behavioral intention to exercise for women only.

Different from studies reviewed above, Miquelon, Castonguay, and Castonguay (2017) included integrated regulation to examine all six motivational regulations in relation to PA behavior consistency and PA behavior maintenance in a sample of adults in age from 18 to 65 years. They found that only integrated regulation positively predicted PA behavior consistency and PA behavior maintenance over time. Considered together, more research work is needed to further determine the nature of motivational regulations in the prediction of students' outcomes in physical activity/physical education settings.

To assess students' motivational regulations, most of the research work has primarily used the Behavioral Regulations in Exercise Questionnaire (BREQ; Mullan, Markland, & Ingledew, 1997) and the Behavioral Regulations in Exercise Questionnaire-2 (BREQ-2; Makland & Tobin, 2004). However, these two instruments failed to take integrated regulation into account. To address this omission, Wilson, Rodgers, Loitz, and Scime (2006) developed the Behavioral Regulations in Exercise Questionnaire-3 (BREQ-3), providing a reliable and valid measure assessing all six motivational regulations proposed in the SDT. While utilized in

academic and sport settings, the psychometric properties of BREQ-3 in the context of college physical activity are unknown and thus need to be examined.

2.1.3 Links between Achievement Goals and Motivational Regulations

The theoretical links between achievement goals and motivational regulations, including motivational regulations as mediators, have been investigated in physical activity settings. (Conroy, Kaye, & Coatsworth, 2006; Moreno, González-Cutre, Sicilia, & Spray, 2010; Su, McBride, & Xiang, 2015). Gao and colleagues (2012) examined achievement goals, motivation regulations, and their relations to effort/persistence in college PA classes. Findings revealed mastery-approach and performance-approach goals positively predicted intrinsic regulations, mastery-approach goals positively predicted identified regulations, and these variables all positively predicted students' effort/persistence in PA classes. Su, McBride, and Xiang (2015) utilized structural equation modeling to investigate relationships between achievement goals and motivational regulations in college PA classes. They observed that mastery-approach goals positively predicted intrinsic regulation and identified regulations.

Examining motivational regulations as mediators, Biddle, Soos and Chatzisarantis (1999) reported that identified regulation and intrinsic regulation mediated the relationship between task orientation (i.e., mastery goal) and intention to participate in sport in a sample of Hungarian youth. Similarly, Georgiadis, Biddle, and Chatzisarantis (2001) reported that identified regulation and intrinsic regulation mediated the relationship between task orientation and physical self-worth in a sample of adult exercisers in Greece. They also found that identified regulation and intrinsic regulation mediated the relationship between ego orientation (i.e., performance goal) and physical self-worth. It is important to note that the above reviewed work

on relationships between achievement goals and motivational regulations has based on the dichotomous or 2 × 2 goal model and did not include integrated regulation. Therefore, there is a need to expand this line of research by examining the 3 × 2 goal model in relation to all motivational regulations depicted in SDT. Such inquiry can provide a more complete picture of what motivates students in college physical activity classes.

In sum, the 3 × 2 achievement goal model and motivational regulations as they relate to achievement/educational outcomes (i.e., persistence/effort, enjoyment, perceived health, and physical activity) have not been extensively examined in college PA settings. Because of this, little data exist concerning the reliability and validity of instruments designed to assess these two concepts. Therefore, the psychometric properties of the 3 × 2 Achievement Goal Questionnaire (3 × 2 AGQ) and the Behavioral Regulation in Exercise Questionnaire-3 (BREQ-3) were first examined. Upon demonstrating acceptable psychometric properties, the relationships among the achievement goals, motivational regulations, and achievement/educational outcomes in college PA classes were then investigated. Specifically, in a college PA setting, the present study answered the following research questions:

(1) What are the psychometric properties of the 3 × 2 achievement goal questionnaire (3 × 2 AGQ) and the behavioral regulation in exercise questionnaire-3 (BREQ-3) among American college students in PA classes?
(2) What is the predictive power of achievement goals and motivational regulations in students' achievement/educational outcomes?
(3) Do motivational regulations mediate the relationships between achievement goals and students' achievement/educational outcomes?

(4) What perceived experiences/factors contribute to students' endorsement of achievement goals?

This question was proposed to provide in-depth information about what was perceived to impact college students' endorsement of achievement goals in PA classes. With such information, instructors may become more effective in their effort to promote achievement goals that are motivationally beneficial to students in college PA classes.

2.2 Methods

2.2.1 Participants and Setting

Participants consisted of 556 college students (M =20.31 years, SD = 1.34) enrolled in PA classes at a major university in the southwest U.S. A sample of more than 500 participants in the present study ensured the precision of estimation in the statistical analyses specified later. The sample included 305 males (54.9%) and 251 females (45.1%); 53 freshmen (9.5%), 135 sophomores (24.3%), 126 juniors (22.7%), 233 seniors (41.9%), and 9 5th year students (1.6%). Ethnicities consisted of 359 Caucasian-American (64.6%), 112 Hispanic-American (20.1%), 21 African-American (3.8%), 36 Asian-American (6.5%), and 28 other ethnicities (5.0%). The sample reflected the overall ethnic makeup of the student body at this university. University colleges that participants attended included engineering, liberal arts, agriculture and life science, business, veterinary medicine and biomedical sciences.

The PA classes examined in the study included basketball, volleyball, rock-climbing, racquetball, swimming, soccer, pilates-barre, and judo. The majority of participating students took them as an elective. These classes occurred twice a week on either Monday/Wednesday for 50 minutes or Tuesday/Thursday for 75 minutes with the exception of the two rock-climbing

classes that were held once a week on Monday or Wednesday for 2 hours. Class size varied from 14 to 30 students.

Eight male and four female instructors taught the classes. Their teaching experience ranged from 4 to 32 years. They primarily utilized the command teaching style (Mosston & Ashworth, 1994) in their classes. This style is characterized by teachers making all decisions and students following teachers' instructions. As such, it is the most teacher-centered style within the teaching spectrum (Mosston & Ashworth, 1994).

2.2.2 Variables and Measures

2.2.2.1 Demographic information

A biographical questionnaire (see Appendix I) gathered information on students' backgrounds, including age, gender, ethnicity, classification, college, and the type of PA classes they were taking (e.g., basketball, judo, swimming).

2.2.2.2 Achievement goals

The 3 × 2 Achievement Goals Questionnaire (3 × 2 AGQ; Elliot et al., 2011) was adapted to assess achievement goals in the present study. Specifically, the stem of the 3 × 2 AGQ was modified from "In this class" to "In this physical activity class, my goal is…" and the wording of "exams/questions" was changed to "physical activities/movements." The adapted 3 × 2 AGQ, as shown in Appendix J, consisted of 18 items with three items assessing each of the six achievement goals: task-approach (e.g., to get a lot of physical activities/movements right), task-avoidance (e.g., to avoid doing physical activities/movements wrong), self-approach (e.g., to improve myself in physical activities/movements), self-avoidance (e.g., to avoid performance

decline), other-approach (e.g., to do well compared to others), and other-avoidance (e.g., to avoid doing poorly in comparison to others). The items were followed by a 7-point Likert scale ranging from 1 (*Not at all true of me*) to 7 (*Extremely true of me*).

2.2.2.3 Motivational regulations

The Behavioral Regulation in Exercise Questionnaire-3 (BREQ-3; Wilson, Rodgers, Loitz, & Scime, 2006) was adapted to assess motivational regulations in PA classes. The BREQ-3 evolved from the original Behavioral Regulation in Exercise Questionnaire (BREQ; Mullan, Markland, & Ingledew, 1997) and captures the major reasons for physical activity participation. The instrument draws from the self-determination theoretical framework (Deci & Ryan, 1985, 1991). The BREQ-3 consists of 24 items with four items assessing each of the six motivational regulations: amotivation (e.g., I don't see why I should have to participate), external regulation (e.g., I participate because other people say I should), introjected regulation (e.g., I feel guilty when I don't participate), identified regulation (e.g., It's important to me to participate), integrated regulation (e.g., I participate because it is consistent with my life goals), and intrinsic regulation (e.g., I participate because it's fun) (see Appendix K). Participants were asked to think of the PA class that they were currently taking when responding to all items on a 7-point Likert scale, ranging from 1 (*Not at all true of me*) to 7 (*Extremely true of me*).

2.2.2.4 Persistence/effort

Persistence is defined as a continued investment in learning in the face of difficulty, and effort refers to the overall amount of energy or work expended in the process of learning (Pintrich, Smith, Garcia, & McKeachie, 1993; Zimmerman & Risemberg, 1997). This construct

was assessed by four items adapted from Guan, Xiang, McBride, and Bruene (2006) (see Appendix L 1.a-d). The stem for all items was "In this physical activity class…" The four items were: "I work hard to do well even if I do not like something we are doing," "I spend extra time and effort trying to do well," "I overcome difficulties to participate regularly," and "I push myself as far as possible when I am already physically tired." Participants rated each item on a 7-point Likert scale ranging from 1 (*Not at all true of me*) to 7 (*Extremely true of me*). In the present study, this measure demonstrated good construct validity, $\chi^2_{(2)} = 7.389$, $p = .025$, CFI = .987, TLI = .962, RMSEA = .074, SRMR = .017. It also showed acceptable reliability with Cronbach's $\alpha = .805$.

2.2.2.5 Enjoyment

To assess this construct, the Physical Activity Enjoyment Scale (PACES), developed by Kendzierski and DeCarlo (1991), was adapted in this study. The PACES originally consisted of 18 bipolar statements, but only four of them specifically satisfied the purpose of the present study (see Appendix L 2.a-d). The four statements were: "In this physical activity class, I work hard to do well even if I do not like something we are doing," "I find this physical activity class pleasurable," "This physical activity class gives me a strong feeling of success," and "I have a lot of fun in this physical activity class." Participants rated each statement on a 7-point Likert scale, ranging from 1 (*Not at all true of me*) to 7 (*Extremely true of me*). The present study revealed acceptable construct validity ($\chi^2_{(2)} = 14.700$, $p < .001$, CFI = .984, TLI = .953, RMSEA = .114, SRMR = .020) and reliability (Cronbach's *alpha* = .890) for this four-item measure.

2.2.2.6 Perceived health

Perceived health is defined as an individual's self-assessment of his/her present health status and level of functioning. Two items adapted from Guinn (1995) assessed this construct on a 7-point Likert scale from 1 (*Extremely poor*) to 7 (*Extremely good*). They were "How would you rate your own health at present?" and "What do you think of your own health condition compared to that of other men/women of your age?" (see Appendix L 3.a-b). According to the view that when tested for construct validity, measures must include at least three items (Bollen, 1989; Gorsuch, 1983), no construct validity was examined for this perceived health measure as it consisted of two items only. The measure, however, demonstrated good reliability with Cronbach's $\alpha = .866$.

2.2.2.7 Physical activity

We assessed this variable using the ActiGraph GT3X+ accelerometer (ActiGraph, Pensacola, FL, USA). Accelerometers have been shown to provide valid and reliable measures of physical activity for populations ranging from toddlers to adults (Adams, Goad, Sahlqvist, Bull, Cooper, & Ogilvie, 2014; Keadle, Shiroma, Freedson, & Lee, 2014; Ozemek, Kirschner, Wilkerson, Byun, & Kaminsky, 2014; Sasaki, John, Freedson, 2011). The ActiGraph GT3X+ accelerometer is a small lightweight (4.6cm × 3.3cm × 1.5cm) tri-axial activity monitor providing data on physical activity levels including activity counts. A triaxial (i.e., vertical, antero-posterior, & medio-lateral) accelerometer is capable of sampling up to 100 Hz. Thus, the GT3X+ provides access to the raw triaxial acceleration data allowing for analysis of accelerations not only in the vertical direction but also in the anterior and posterior direction (ActiGraph, Pensacola, FL, USA).

The accelerometers were programmed to collect data in 60-second epochs and provide time spent in sedentary, light, moderate, vigorous, and moderate-to-vigorous physical activity (MVPA) over three consecutive classes. The cut-points recommended by Freedson et al. (1998) determined PA intensity levels.

2.2.2.8 Perceived experiences/factors contributing to achievement goal endorsement

Semi-structured interviews (see Appendix M) explored experiences/factors students perceived as contributing to their endorsement of achievement goals in their PA classes. To achieve this, 53 students were selected and interviewed individually based on their achievement goal scores as measured by the 3 × 2 AGQ. Doing so ensured that task/self-approach goals, other-approach goals, task/self-avoidance goals, and other-avoidance goals and their respective contributing factors could be explored in interviews. Informed by Guan (2004) and Su (2014), the interview questions were:

(1) Why do you want to take this class?

(2) What is your goal for this class?

(3) What helped you do well in this class?

(4) When you completed the questionnaire a few weeks ago, you indicated that you strongly agreed/disagreed with statements that measured task/self-approach goals, other-approach goals, task/self-avoidance goals, or other-avoidance goals. Would you please tell me why you strongly agreed/disagreed with these statements?

(5) Was there anything in this physical activity class that made you want to strongly agree/disagree with these statements?

The first three questions explored general goals or approaches that students had for their PA classes. The last two questions attempted to identify specific factors that students perceived influenced their achievement goal endorsements in PA classes. The wording of the questions somewhat differed as a function of what achievement goal was endorsed or not endorsed. For example, for a student who strongly endorsed the task/self-approach goal, s/he was asked, "Would you please tell me why you strongly agreed with statements such as my goal is to get a lot of physical activities/movements right and my goal is to do well relative to how well I had done in the past?" For a student who did not support the other-avoidance goal, s/he was asked, "Would you please tell me why you strongly disagreed with statements such as my goal is to avoid preforming worse than others and my goal is to avoid doing poorly in comparison to others?"

2.2.3 Procedures

Upon obtaining institutional review board (IRB) approval, instructors were contacted for permission to collect data in their PA classes during the fall semester of 2016. Students were asked to provide informed consent and only those who agreed to participate in the study completed questionnaires during their regularly scheduled PA classes. Questionnaires took 20 minutes to complete.

Approximately two weeks after the completion of the questionnaires, 224 out of 556 participants were randomly selected to wear accelerometers during their activity classes. Students wore accelerometers on an elastic belt on their right hip from the beginning to end of the class for three consecutive classes. Due to tardiness, injuries, or absences, only 217 students provided data for two or three consecutive classes, that was subsequently subjected to analyses.

After the collection of accelerometer data, 53 volunteers (male: 32, female: 21) were selected to be individually interviewed based on their achievement goal scores. Each interview occurred in a quiet place, such as an available classroom and office, and lasted about 20 minutes. All interviews were audiotaped, transcribed verbatim, and subjected to analysis of content techniques.

2.2.4 Data Analysis

IBM SPSS Statistics Version 23.0 (IBM Corp., 2014) was used for preliminary analyses, including data screening, and the computation of Cronbach's αs, while Mplus Version 7.4 (Muthén & Muthén., 2015) was used for confirmatory factor analyses (CFA) and structural equation modeling (SEM) in the present study.

2.2.4.1 Preliminary analyses for questionnaire data

Initial data screening searched for missing data, outliers, and normality (observed if the absolute value of Skewness and Kurtosis is smaller than 3 and 10, respectively; Kline, 2005). Multivariate outliers were processed based on the probabilities of each case's Mahalanobis Distance (MD) values. If the MD probability was < .001, the corresponding case was removed.

2.2.4.2 Preliminary analyses for accelerometer data

Data from each accelerometer were downloaded to ActiLife 6.0 for sorting and processing. The activity counts per minute over three consecutive classes were then calculated and categorized as sedentary (0 to 99 counts/mins), light (100 to 1951 counts/mins), moderate (1952 to 5724 counts/mins), and vigorous (5725 to 9498 counts/mins). Overall MVPA was

>1952 counts/mins. All cut points were suggested by Freedson et al. (1998). MVPA was determined by adding the moderate and vigorous cut points together. ActiLife 6.0 provided percentage of time spent at different intensities of physical activity for each participant. Only MVPA was analyzed as a measure of physical activity in relation to other variables in this study because of its prominence in national policies (e.g., CDC, 2010; USDHHS, 2008) and research literature on physical activity (e.g., Sebire, Standage, & Vansteenkists, 2011; Standage, Sebire, & Loney, 2008).

2.2.4.3 Confirmatory factor analyses (CFAs) and Cronbach's alpha analyses

To address the first research question, CFAs examined the construct validity of the 3 × 2 AGQ and BREQ-3 in the context of college PA classes. The two measures assessed the 6-factor model of achievement goals (Elliot et al, 2011) and the 6-factor model of motivational regulations (Wilson et al., 2006), respectively. Consistent with the research literature (Elliot et al., 2011 & Wilson et al., 2006), the goodness-of-fit indices include: (a) chi-square (χ^2) (tests the discrepancy between a proposed model and data, a *p* value greater than .05 indicates a good fit; Kline, 2016), (b) the comparative fit index (CFI) (values larger than .90 indicate a good fit; Bentler, 1990), (c) the Tucker-Lewis index (TLI) (values larger than .90 indicate a good fit and values between .80 and .89 are deemed to be adequate fit; Meyers, Gamst, & Guarino, 2013; Tabachnick & Fidell, 2007), (d) the root mean square error of approximation (RMSEA) and standardized root mean square residual (SRMR) (less than .05 is considered to be a good fit, and .06-.08 is considered to be an acceptable fit, while above .08 is not considered to be an acceptable fit; Hu & Bentler, 1999) and (e) models with smaller Akaike information criterion

(AIC; Akaike, 1974) and Bayesian information criterion (BIC; Schwarz, 1978) have better fit, when two or more models are compared.

Additionally, factor loadings of indicators should be greater than .40 (Comrey & Lee, 1992), such loadings are effective in assessing their corresponding constructs. Similarly, correlations between factors should be lower than .85, a value that indicates that factors have a good discriminant validity (Brown, 2014). Modification indices (labeled M.I. in Mplus) can also be used to determine whether an indicator displays cross loadings, and whether an indicators' residuals correlate with other indicators' residuals. If an indicator loads on more than one factor, the indicator does not definitely measure its designated construct and should be deleted. If an indicator's residuals correlate with other indicators' residuals with modification indices reaching a value of 10 or higher, the indicator often causes substantial problems and should be deleted or set to correlate with other indicators' residuals.

After CFAs revealed a satisfactory model fit for both the 3 × 2 AGQ and BREQ-3, Cronbach's αs were computed to provide reliability evidence for the scores of achievement goals and motivational regulations.

2.2.4.4 Descriptive statistics and correlations

Descriptive statistics provided the univariate characteristics of students' achievement goals, motivational regulations, and achievement/educational outcomes. Pearson correlation coefficients were calculated for linear correlations among all study variables. More specifically, correlation coefficients among achievement goals, motivational regulations, persistence/effort, enjoyment, and perceived health were first calculated, followed by correlation coefficients among achievement goals, motivational regulations and physical activity.

2.2.4.5 Structural equation modeling (SEM)

To address the second and third research questions, prediction of achievement goals and motivational regulations in students' achievement/educational outcomes (i.e., persistence/effort, enjoyment, perceived health, and physical activity) and meditation of motivational regulations (both direct and indirect effects) in the relationships between achievement goals and students' achievement/educational outcomes, two sets of SEMs with robust maximum likelihood (MLR) were conducted, with one SEM on the data provided by questionnaires only and the other SEM on the questionnaire data of achievement goals and motivational regulations and the accelerometer data of physical activity. As indicated earlier, only 217 out of 556 participants were able to provide accelerometer data on physical activity. As such, a separate SEM should be conducted when it came to examine whether achievement goals and motivational regulations would predict physical activity and whether motivational regulations would mediate the relationship between achievement goals and physical activity.

As a powerful multivariate analysis technique, SEM includes latent variables to account for measurement error (González, De Boeck, & Tuerlinckx, 2008). While conducted in the present study, SEMs followed the two-step rule: a measurement model test as the first step and a structural model test as the second step (Anderson & Gerbing, 1988). The same indices used in the CFAs were applied to determine the model fit in the SEM. They were χ^2, CFI, TLI, RMSEA, and SRMR.

2.2.4.6 Interview data

Interviews were analyzed using analysis of content techniques (Lincoln & Guba, 1985) to address the fourth research question, perceived experiences/factors that contributed to student

achievement goal endorsement. After being transcribed, the interview data were first unitized. Unitizing sorts out the "smallest piece of information that can be interpreted in the absence of any additional information other than a broad understanding of the context in which it occurred" (Lincoln & Guba, 1985, p. 345). After unitization, data were sorted into categories and the categories were then merged into overarching themes. In this process, all interview data were analyzed by two members of the research team experienced in qualitative analysis.

To ensure the trustworthiness of interview data four strategies were implemented. First, member checking occurred at the end of the interviews by asking participants for clarification and verification to enhance the data credibility. Second, the researchers provided alternative perspectives and refined emergent categories and themes by searching for negative cases. Third, peer debriefing occurred on a regular basis in which the researcher's peers were asked to review the data analysis and interpretations. Lastly, data confirmability was assessed through the use of a data audit, which reviewed every step of the analysis.

In this study, the first three interview questions were analyzed together because they tapped into students' general goals and approaches to PA classes they attended. The interview questions four and five were individually analyzed because each provided specific insights why their particular achievement goal was (or was not) strongly endorsed in PA classes. All names reported in the interview data are pseudonyms.

2.3 Results

Results of the present study are reported in the following order: Preliminary analyses, CFAs, Cronbach's alphas, descriptive statistics and correlations, SEMs and content analysis on interview data.

2.3.1 Preliminary Analyses for Questionnaire Data

A total of 556 students participated in this study. Data screening revealed few of them had incomplete and patterned responses. Multivariate outliers were also examined as they were individuals who responded differently compared to other participants across multiple dimensions (Cruz, 2007). Based on multivariate outliers' results, the missing values were computed using Mahalanobis distance values (Tabachnick & Fidell, 2001).

As a result of the data screening, it was determined that among 556 participants, 524 (male: 279, female: 245) provided usable responses for a CFA on achievement goals and 527 (male: 288, female: 239) provided usable responses for a CFA on motivational regulations. But for the SEM, only 490 participants were found to provide usable responses on all variables examined in the analysis. Their demographic data were: ages from 18-26 years (M = 20.34 years, SD = 1.316); 262 males (53.5%) and 228 females (46.5%); 43 (8.8%) freshmen, 116 (23.7%) sophomores, 116 (23.7%) juniors, 206 (42.0%) seniors, and 9 (1.8%) 5^{th} year students; 323 (65.9%) Caucasian-American, 98 (20.0%) Hispanic-American, 27 (5.5%) Asian-American, 19 (3.9%) African-American, and 23 (4.6%) others.

2.3.2 Preliminary Analyses for Accelerometer Data

Among 556 participants, 224 were requested to wear accelerometers to provide data for physical activity. They consisted of 126 (56.3%) males and 98 (43.8%) females, and were between 19 and 26 years of age (M =20.34 years, SD = 1.392). One-hundred seventy-five participants (78.1%) wore the ActiGraph GT3X+ accelerometer for three consecutive classes, forty-two (18.8%) for two classes, and seven (3.1%) for one class only. However, only 217 participants who wore accelerometers two or three times were included in subsequent analyses.

They were 17 (7.8%) freshmen, 60 (27.6%) sophomores, 41 (18.9%) juniors, 96 (44.2%) seniors, and 3 (1.4%) 5th years, and their ages ranged from 18 to 26 years (M = 20.34 years, SD = 1.372). Ethnically, this sample consisted of 150 (69.1%) Caucasian-Americans, 43 (19.8%) Hispanic-Americans, 12 (5.5%) Asian-Americans, 3 (1.4%) African-Americans, and 9 (4.2%) others.

2.3.3 Confirmatory Factor Analyses and Cronbach's Alpha Coefficients

2.3.3.1 Achievement goals

As shown in Figure 1, a CFA revealed the 6-factor model of achievement goals measured by 3 × 2 AGQ was an acceptable fit, $\chi^2_{(120)} = 393.904$, $p < .001$, CFI = .949, TLI = .935, RMSEA = .066, SRMR = .040. All factor loadings of achievement goal indicators ranged from .651 to .970. Factor correlations among the six achievement goals ranged from .298 to .952, with a high correlation observed between task-approach goals and self-approach goals (r = .952) and between task-avoidance goals and self-avoidance goals (r = .934). That is, these two high correlations exceeded the acceptable level (.85) indicating that the corresponding factors were statistically too similar to be considered distinct (Brown, 2014). Taking this into consideration, a second CFA was conducted in which task-approach goals and self-approach goals were combined and labeled task/self-approach goals whereas task-avoidance and self-avoidance were combined and labeled task/self-avoidance goals. Results of this CFA revealed that this 4-factor model also had acceptable fit indices ($\chi^2_{(129)} = 462.733$, $p < .001$, CFI = .938, TLI = .927, RMSEA = .070, SRMR = .047). Factor loadings ranged from .642 to .970, and factor correlations ranged from .309 to .829 (see Figure 2). To compare the 4-factor model and the 6-factor model, AIC and BIC were also needed for consideration. Smaller AIC and BIC values indicate better fit. As shown in Table 1, model fit indices, AIC and BIC were similar for both

models. A comparison between Figure 1 and Figure 2 revealed that all factor loadings were also similar and greater than .40, meaning that all indicators effectively considered their corresponding construct. However, as seen in Figure 1, correlations between task-approach goals and self-approach goals and between task-avoidance goals and self-avoidance goals were .952 and .934, respectively, which suggested that the factors were not distinct. As seen in Figure 2, the 4-factor model revealed that correlations between the four achievement goals ranged from .309 to .829, meaning that the factors were discriminant from each other. Considered together, it seemed that the 4-factor model had a better fit than the 6-factor model for this group of college students in PA classes. Four achievement goal scores were computed by averaging their respective items. All scores demonstrated acceptable internal consistency with Cronbach's αs for task/self-approach goals, other-approach goals, task/self-avoidance goals, and other-avoidance goals being .891, .913, .867, and .939, respectively.

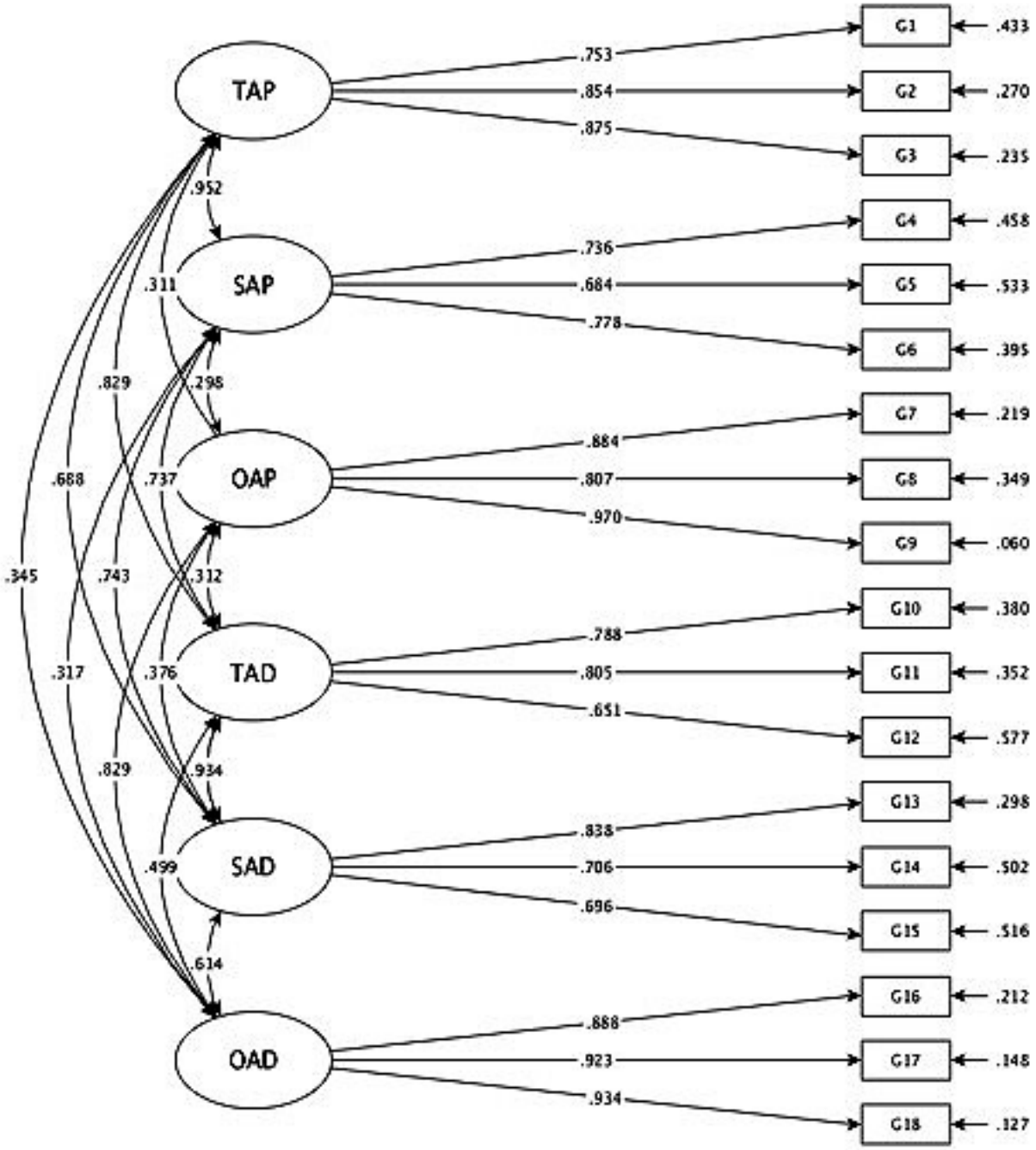

Figure 1. The original 6-factor CFA model for achievement goals. *Note.* $N = 524$. TAP = task-approach goals, SAP = self-approach goals, OAP = other-approach goals, TAD = task-avoidance goals, SAD = self-avoidance goals, OAD = other-avoidance goals.

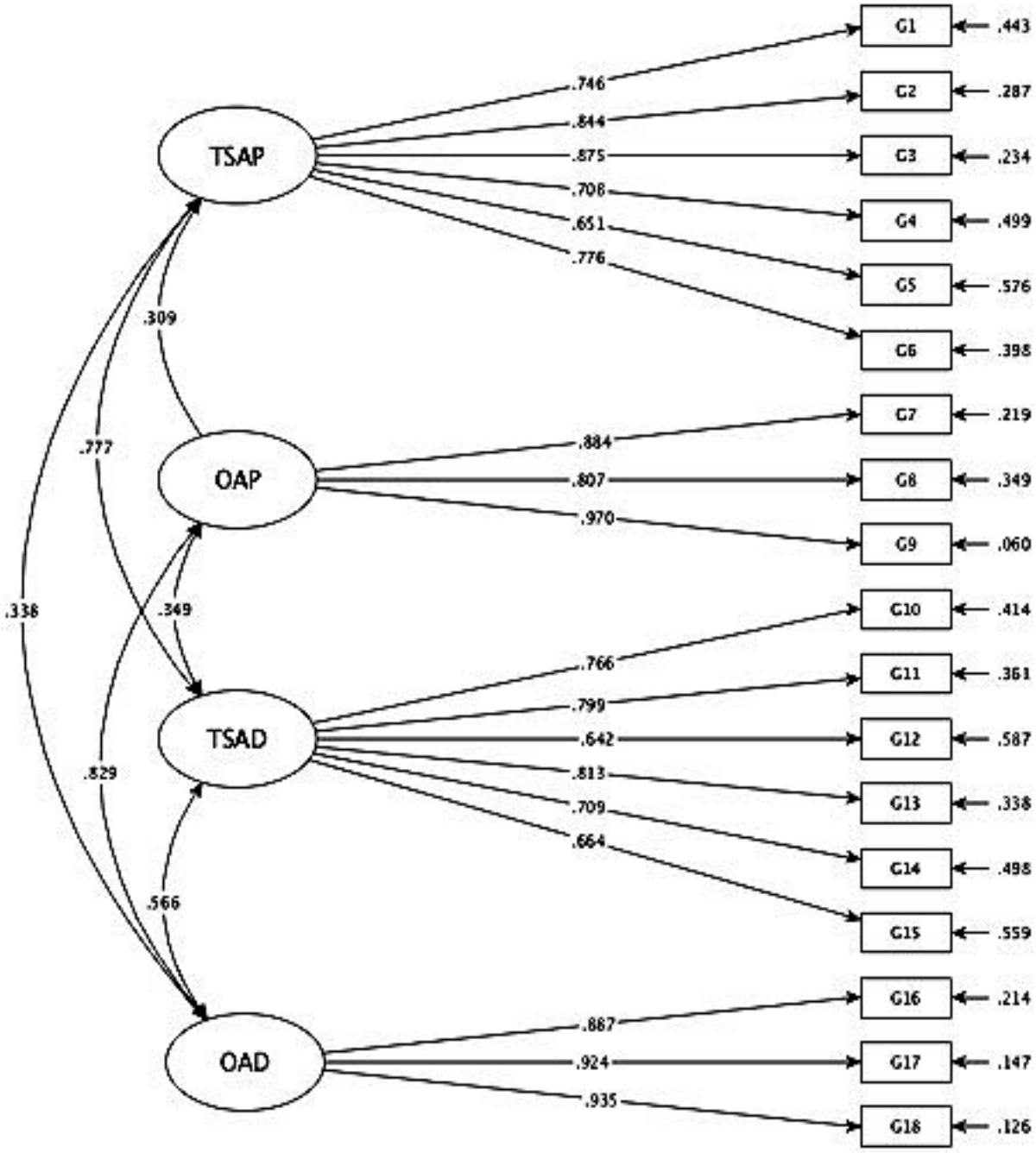

Figure 2. The 4-factor CFA model for achievement goals. *Note.* $N = 524$. TSAP = task/self-approach goals, OAP = other-approach goals, TASD = task/self-avoidance goals, OAD = other-avoidance goals.

Table 1. Comparison of two achievement goal models

	χ^2	*df*	CFI	TLI	RMSEA	SRMR	AIC	BIC
6-factor model	393.904**	120	.949	.935	.066	.040	27915.251	28209.688
4-factor model	462.733**	129	.938	.927	.070	.047	27986.436	28242.468

2.3.3.2 Motivational regulations

As shown in Figure 3, a CFA conducted on the scores of six motivational regulations assessed by BREQ-3 revealed a marginal fit between the 6-factor model and the data ($\chi^2_{(237)}$ = 751.345, $p < .001$, CFI = .898, TLI = .881, RMSEA = .064, SRMR = .063), though factor loadings ranged from .533 to .914, and factor correlations ranged from -.411 to .861. Because of the marginal fit, there was a need to examine the modification indices to identify areas of model fit improvement. Such examination revealed that B12 (i.e., "I get restless if I don't participate regularly") assessing identified regulation cross-loaded onto integrated regulation, amotivation, external regulation, and introjected regulation. Additionally, a 118.761 residual correlation was found between the item "I can't see why I should bother participating" (B6 in Figure 3) and the item "I don't see the point in participation" (B7 in Figure 3), and a 36.167 residual correlation was also found between items "It's important to me to participate" (i.e., B1 in Figure 3) and "I value the benefits of regular participation in physical activity" (B2 in Figure 3). Therefore, a second CFA was conducted where item 12 was removed, and a path was added between B6 and B7 and between B1 and B2 as well. Results revealed a good fit between the model and data, $\chi^2_{(213)}$ = 468.985, $p < .001$, CFI = .946, TLI = .936, RMSEA = .048, SRMR = .050 (see Figure 4). All factor loadings were greater than .50 and factor correlations ranged from -.433 to .838.

Based on these results, scores of six motivational regulations were calculated by averaging their respective items. Cronbach's αs for the intrinsic regulation, integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation scores were .852, .859, .675, .772, .783, and .799, respectively. These values demonstrated acceptable internal consistency.

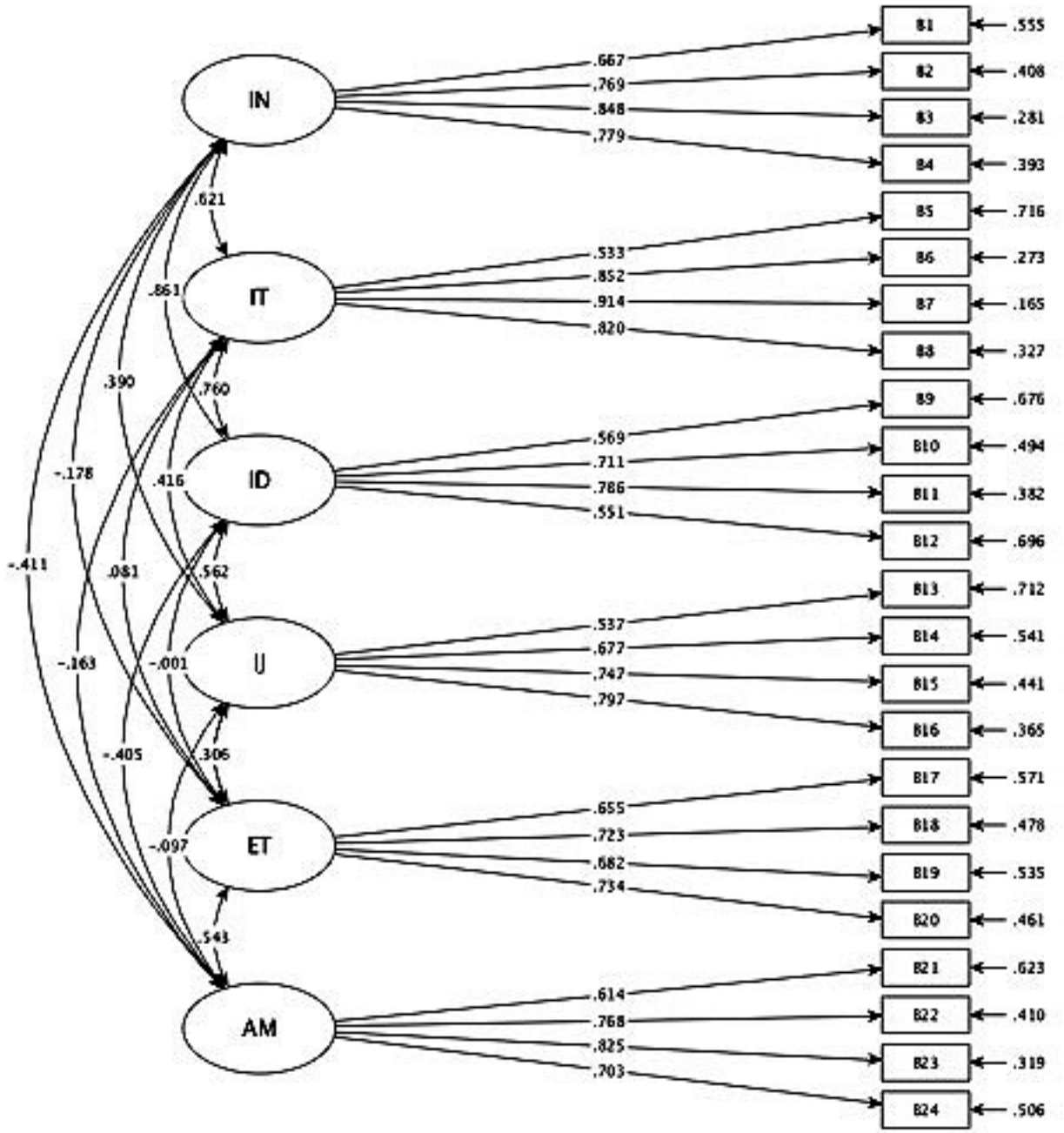

Figure 3. The 6-factor CFA model for motivational regulations. *Note.* $N = 527$. IN = intrinsic regulation, IT = integrated regulation, ID = identified regulation, IJ = introjected regulation, ET = external regulation, AM = amotivation.

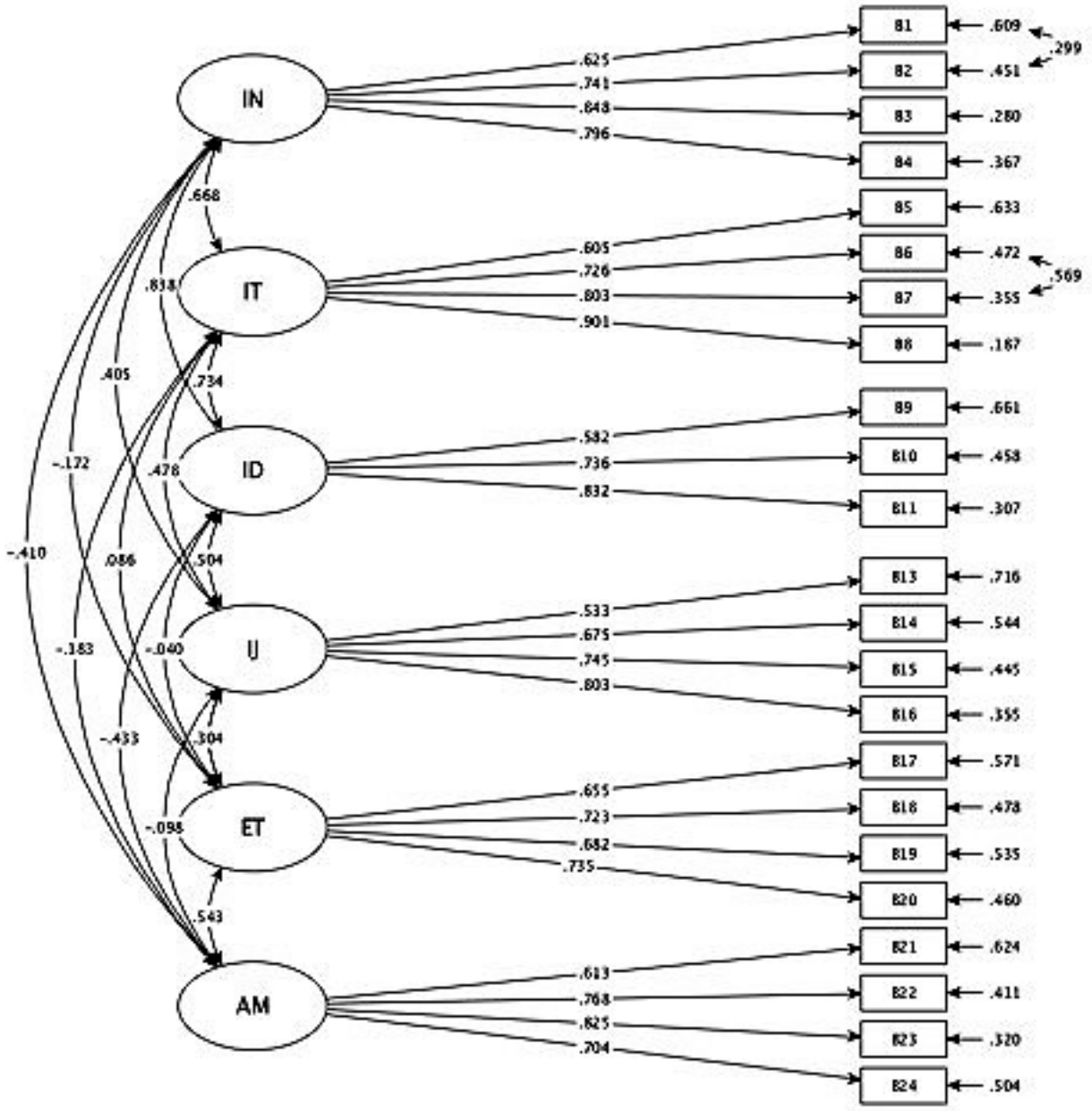

Figure 4. The modified 6-factor CFA model for motivational regulations. *Note. N* = 527. IN = intrinsic regulation, IT = integrated regulation, ID = identified regulation, IJ = introjected regulation, ET = external regulation, AM = amotivation.

2.3.4 Descriptive Statistics and Correlations

Descriptive statistics for all variables examined in the study are provided in Table 2. As indicated in the table, the data were normally distributed (Skewness ranged from -1.093 to 1.898 and Kurtosis ranged from -.914 to 4.304), The mean scores of task/self-approach goals (M = 5.786, SD = .905), other-approach goals (M = 4.354, SD = 1.718), task/self-avoidance goals (M = 5.055, SD = 1.278), and other-avoidance goals (M = 4.305, SD = 1.730) were higher than the midpoint of the scales (i.e., 4), indicating that students in the present study endorsed all these goals.

The mean scores of intrinsic regulation (M = 6.074, SD = .905), integrated regulation (M = 5.096, SD = 1.364), identified regulation (M = 5.930, SD = .889), and introjected regulation (M = 4.176, SD = 1.408) were all above the midpoint of the scales. In contrast, the mean scores of external regulation (M = 1.968, SD = .984) and amotivation (M = 1.372, SD = .552) were far below the midpoint of the scales (i.e., 4). Taken together, these results seemed to suggest that participants of this study supported self-determined regulations.

The mean scores of persistence/effort (M = 5.222, SD = 1.112), enjoyment (M = 6.244, SD = 0.815), and perceived health (M = 5.164, SD = .965) were above the midpoint of the scales (i.e., 4), with enjoyment having the highest mean score. These scores indicated that participants in the present study had positive perceptions of these achievement/educational outcomes. The mean percentage of time spent in MVAP was 38.853%, which failed to meet the current recommendations that students need to spend at least 50 percent of physical education/PA class time in MVPA (USDHHS, 2008). As seen in Table 3, the four achievement goals were positively correlated with students' achievement/educational outcomes (i.e., persistence/effort, enjoyment, and perceived health). Task/self-approach goals were positively correlated with identified

regulation and intrinsic regulation, but were not correlated with external regulation. Other-approach goals were positively correlated with integrated regulation, intrinsic regulation, introjected regulation, identified regulation, and external regulation. Task/self-avoidance goals were positively correlated with identified regulation, integrated regulation, intrinsic regulation and introjected regulation, but were negatively correlated with amotivation. Other-avoidance goals were also positively correlated with introjected regulation, integrated regulation, intrinsic regulation, external regulation, and identified regulation. Intrinsic regulation, integrated regulation, and identified regulation were positively correlated with the achievement/education outcomes. Amotivation was negatively correlated with persistence/effort and enjoyment. However, external regulation was not correlated with students' achievement/educational outcomes.

As shown in Table 4, task/self-approach goals, other-approach goals, and task/self-avoidance goals were positively correlated with intrinsic regulation, integrated regulation, and identified regulation. Task/self-avoidance goals and other-avoidance goals were positively correlated with introjected regulation and external regulation. Task/self-approach goals were positively correlated with introjected regulation, but were negatively correlated with amotivation. Task/self-approach goals were not correlated with MVPA, but other-approach goals, other-avoidance goals, and amotivation were positively correlated with MVPA.

Table 2. Descriptive statistics

	N	Mean	SD	Range	Skewness	Kurtosis
Achievement goals						
TSAP	490	5.786	.905	2.830-7.000	-.704	.260
OAP	490	4.354	1.718	1.000-7.000	-.203	-.895
TSAD	490	5.055	1.278	1.330-7.000	-.422	-.443
OAD	490	4.305	1.730	1.000-7.000	-.247	-.914
Motivational regulations						
IN	490	6.074	.824	3.250-7.000	-.906	.419
IT	490	5.096	1.364	1.250-7.000	-.476	-.501
ID	490	5.930	.889	3.330-7.000	-.631	-.331
IJ	490	4.176	1.408	1.000-7.000	-.097	-.671
ET	490	1.968	.984	1.000-6.000	1.157	.960
AM	490	1.372	.552	1.000-4.500	1.898	4.304
Achievement/Educational outcomes						
PEF	490	5.222	1.112	2.250-7.000	-.303	-.565
ENJ	490	6.244	.815	3.500-7.000	-1.093	.686
PH	490	5.164	.965	2.500-7.000	-.270	-.112
MVPA	217	38.853	15.779	2.230-76.200	.060	-.346

Note. TSAP = task/self-approach goals, OAP = other-approach goals, TASD = task/self-avoidance goals, OAD = other-avoidance goals; IN = intrinsic regulation, IT = integrated regulation, ID = identified regulation, IJ = introjected regulation, ET = external regulation, AM = amotivation; PEF = persistence/effort, ENJ = enjoyment, PH = perceived health, MVPA = moderate to vigorous physical activity.

Table 3. Correlations among achievement goals, motivational regulations, and outcomes variables

	TSAP	OAP	TASD	OAD	IN	IT	ID	IJ	ET	AM	PEF	ENJ	PH
TSAP	-												
OAP	.323**	-											
TSAD	.701**	.317**	-										
OAD	.318**	.777**	.518**	-									
IN	.480**	.276**	.337**	.187**	-								
IT	.408**	.305**	.375**	.224**	.558**	-							
ID	.542**	.172**	.423**	.125**	.672**	.605**	-						
IJ	.263**	.207**	.301**	.303**	.300**	.365**	.396**	-					
ET	.032	.141**	.109*	.171**	-.118**	.100*	-.010	.292**	-				
AM	-.174**	.050	-.110*	.025	-.322**	-.151**	-.334**	-.044	.417**	-			
PEF	.477**	.261**	.414**	.230**	.513**	.559**	.542**	.326**	.036	-.206**	-		
ENJ	.418**	.206**	.362**	.206**	.698**	.464**	.544**	.306**	-.045	-.288**	.481**	-	
PH	.184**	.155**	.138**	.101*	.203**	.354**	.251**	-.002	-.070	-.038	.217**	.135**	-

Note. TSAP = task/self-approach goals, OAP = other-approach goals, TASD = task/self-avoidance goals, OAD = other-avoidance goals; IN = intrinsic regulation, IT = integrated regulation, ID = identified regulation, IJ = introjected regulation, ET = external regulation, AM = amotivation; PEF = persistence/effort, ENJ = enjoyment, PH = perceived health. *$p < .05$, **$p < .001$.

Table 4. Correlations among achievement goals, motivational regulations, and MVPA variables

	TSAP	OAP	TASD	OAD	IN	IT	ID	IJ	ET	AM	MVPA
TSAP	-										
OAP	.115	-									
TSAD	.565**	.254**	-								
OAD	.142*	.773**	.435**	-							
IN	.410**	.173*	.253**	.126	-						
IT	.290**	.248**	.291**	.163*	.500**	-					
ID	.371**	.185**	.213**	.120	.595**	.643**	-				
IJ	.183**	.083	.157*	.218**	.247**	.329**	.418**	-			
ET	-.001	.191**	.163*	.213**	-.241**	.075	-.011	.251**	-		
AM	-.153*	.110	.007	.108	-.342**	-.111	-.278**	-.055	.379**	-	
MVPA	-.097	.200**	-.049	.137*	.132	.078	-.024	-.047	.056	.208**	-

Note. TSAP = task/self-approach goals, OAP = other-approach goals, TASD = task/self-avoidance goals, OAD = other-avoidance goals; IN = intrinsic regulation, IT = integrated regulation, ID = identified regulation, IJ = introjected regulation, ET = external regulation, AM = amotivation; MVPA = moderate to vigorous physical activity. *$p < .05$, **$p < .001$.

2.3.5 SEM with Questionnaire Data Only

At the first step of the two-step SEM approach, the measurement model was constructed to examine the relationships between indicators and their underlying variables. The measurement model had a good fit, $\chi^2_{(1144)} = 2176.386$, $p < .001$, CFI = .930, TLI = .922, RMSEA = .043, SRMR = .051. For all the variables, factor loadings ranged from .544 to .967, and factor correlations ranged from -.405 to .845. Intrinsic regulation was highly correlated with identified regulation ($r = .845$), and other-approach goals were highly correlated with other-avoidance goals ($r = .819$).

At the second step, the structural model was constructed to examine relationships among achievement goals, motivational regulations, persistence/effort, enjoyment, and perceived health and the mediation of motivational regulations (both direct and indirect effects) in the relationships between achievement goals and these achievement/educational outcomes (see Figure 5). Results of this examination revealed an adequate fit between the model and data, $\chi^2_{(1185)} = 2374.977$, $p < .001$, CFI = .919, TLI = .913, RMSEA = .045, SRMR = .077.

In this model, 55.2% of the variance in persistence/effort was explained by integrated regulation and identified regulation. The 62.1% of the variance in enjoyment was explained by intrinsic regulation and integrated regulation. The 24% of the variance in perceived health was explained by integrated regulation and introjected regulation. In addition, 31.9% of the variance in intrinsic regulation was explained by task/self-approach goals and other-approach goals. The 25.8% of the variance in integrated regulation was explained by task/self-approach goals and other-approach goals. Task/self-approach goals accounted for 45.4% of the variance in identified regulation. The 15.9% of the variance in introjected regulation was explained by task/self-avoidance goals and other-avoidance goals, while 3.4% of the variance in external regulation

was explained by other-approach goals. The 7.1% of the variance in amotivation was explained by task/self-approach goals and other-avoidance goals. Table 5 presents the standardized estimates, 95% CI, and *p* values for direct, indirect, and total effects.

2.3.5.1 Achievement goals and motivational regulations as predictors

In Figure 5, the parameters were significant ($p < .05$) and non-significant were not presented. Thus, all solid arrows showed significant path coefficients. Task/self-approach goals positively predicted persistence/effort, enjoyment, and perceived health. Other-approach goals also positively predicted perceived health, but other-avoidance goals negatively predicted perceived health. In addition, intrinsic regulation positively predicted enjoyment. Integrated regulation positively predicted persistence/effort and perceived health, but negatively predicted enjoyment. Identified regulation also positively predicted persistence/effort. Finally, introjected regulation negatively predicted perceived health.

2.3.5.2 Motivational regulations as mediators

Direct effect. As shown in Figure 5, task/self-approach goals had direct effects on persistence/effort, enjoyment, and perceived health. Other-approach goals had a direct effect on perceived health, whereas other-avoidance goals had a negative direct effect on perceived health.

Indirect/mediated effect. Both integrated regulation and identified regulation partially mediated the relationship between task/self-approach goals and persistence/effort. Intrinsic regulation also partially mediated the relationship between task/self-approach goals and enjoyment. Furthermore, integrated regulation partially mediated the relationship between task/self-approach goals and perceived health. Finally, integrated regulation partially mediated the relationship between other-approach goals and perceived health, however, introjected regulation partially negative mediated the relationship between other-avoidance goals and perceived health.

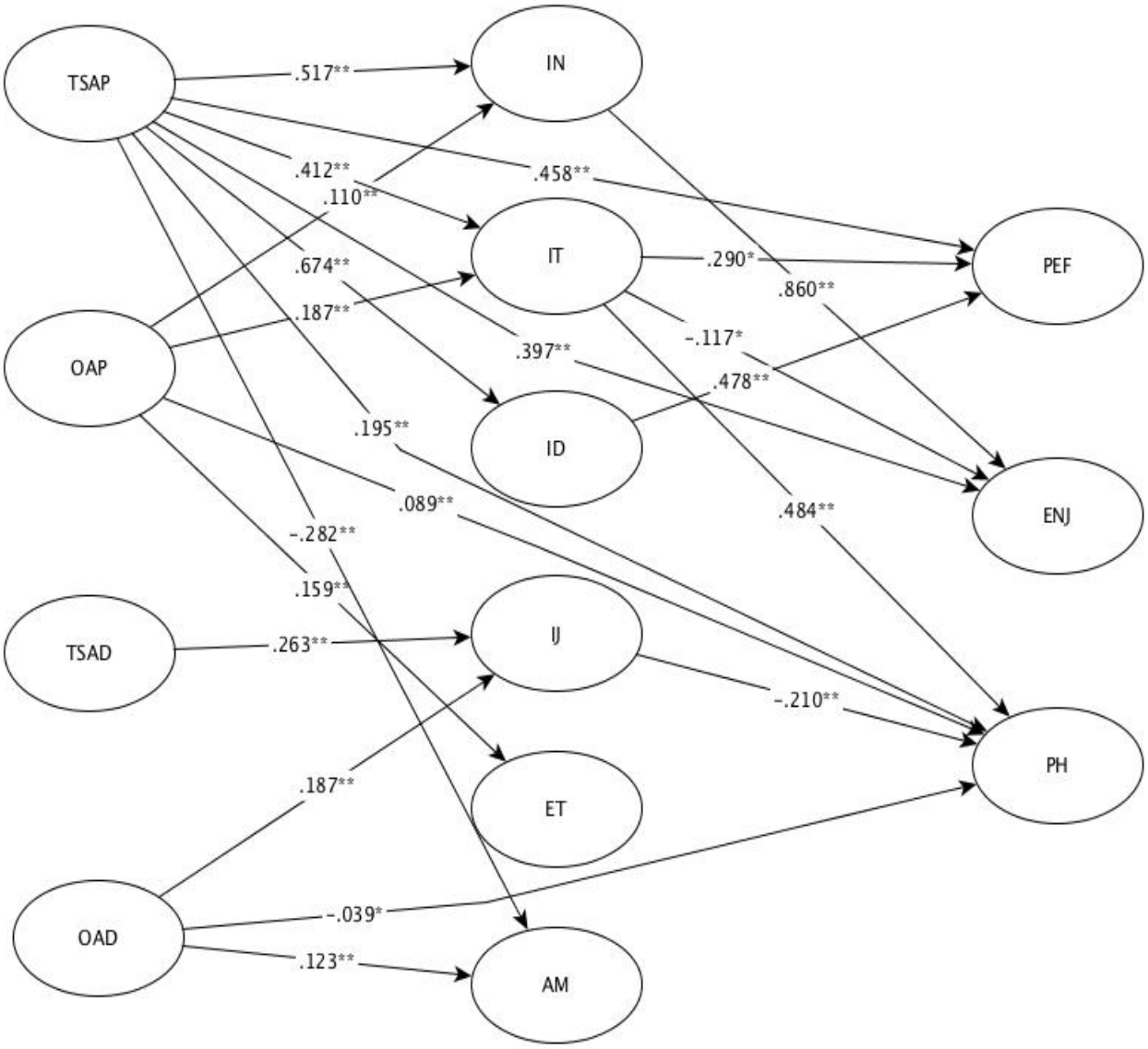

Figure 5. Results of structural equation modeling with questionnaire data only. *Note*. $N = 490$. TSAP = task/self-approach goals, OAP = other-approach goals, TASD = task/self-avoidance goals, OAD = other-avoidance goals; IN = intrinsic regulation, IT = integrated regulation, ID = identified regulation, IJ = introjected regulation, ET = external regulation, AM = amotivation; PEF = persistence/effort, ENJ = enjoyment, PH = perceived health. *$p < .05$, **$p < .001$.

Table 5. Standardized estimates, 95% CI, and p values for direct, indirect, and total effects with questionnaire data only

Effects	Estimate	95% CI	*p*
Direct effects			
TSAP → IN	.517	[.430 .604]	< .01
TSAP → IT	.412	[.305 .520]	< .01
TSAP → ID	.674	[.584 .763]	< .01
TSAP → AM	-.282	[-.375 -.189]	< .01
OAP → IN	.110	[.042 .179]	< .01
OAP → IT	.187	[.089 .284]	< .01
OAP → ET	.159	[.059 .260]	< .01
TASD → IJ	.263	[.125 .402]	< .01
OAD → IJ	.187	[.049 .325]	< .01
OAD → AM	.123	[.032 .213]	< .01
IN → ENJ	.860	[.757 .964]	< .01
IT → PEF	.290	[.041 .539]	< .05
IT → ENJ	-.117	[-.229 -.004]	< .05
IT → PH	.484	[.342 .626]	< .01
ID → PEF	.478	[.233 .724]	< .01
IJ →PH	-.210	[-.316 -.104]	< .01
Indirect effects			
TSAP → IT → PEF	.120	[.013 .226]	< .05
TSAP → ID → PEF	.322	[.138 .507]	< .01
TSAP → IN → ENJ	.445	[.348 .543]	< .01
TSAP → IT → PH	.200	[.111 .288]	< .01
OAP → IT → PH	.090	[.040 .140]	< .01
OAD → IJ → PH	-.039	[-.072 -.007]	< .05
Total effects			
TSAP → PEF	.458	[.351 .566]	< .01
TSAP → ENJ	.397	[.317 .477]	< .01
TSAP → PH	.195	[.126 .264]	< .01
OAP → PH	.089	[.040 .138]	< .01
OAD → PH	-.039	[-.072 -.007]	< .05

Note. TSAP = task/self-approach goals, OAP = other-approach goals, TASD = task/self-avoidance goals, OAD = other-avoidance goals; IN = intrinsic regulation, IT = integrated regulation, ID = identified regulation, IJ = introjected regulation, ET = external regulation, AM = amotivation; PEF = persistence/effort, ENJ = enjoyment, PH = perceived health.

2.3.6 SEM with Data on Achievement Goals, Motivational Regulations and Accelerometer Data

This SEM aimed to examine relationships among achievement goals, motivational regulations and physical activity. As the dependent variable in the analysis, physical activity (MVPA) was assessed by accelerometers. As mentioned earlier, only 217 participating students provided useable accelerometer data. Therefore, these students represented the sample for this SEM. The measurement model had an acceptable model fit, $\chi^2_{(765)} = 1398.175$, $p < .001$, CFI = .848, TLI = .829, RMSEA = .062, SRMR = .067. All factor loadings ranged from .429 to .963, and factor correlations among achievement goals and motivational regulations ranged from -.535 to .809.

The structural model was tested with the hypothesized paths. Results revealed a lack of good fit, $\chi^2_{(786)} = 1494.455$, $p < .001$, CFI = .830, TLI = .814, RMSEA = .064, SRMR = .090. These results called for a modified model. Thus, the insignificant paths were dropped from the initial model to reach model parsimony. The resulting final model shown in Figure 6 indicates a good fit, $\chi^2_{(199)} = 293.711$, $p < .001$, CFI = .938, TLI = .928, RMSEA = .047, SRMR = .087. All factor loadings were from .402 to .932. Factor correlations were from -.308 to .478. The model explained 15.8% of the variance in MVPA. Moreover, 25.1% of the variance in intrinsic regulation was explained by task/self-approach goals and other-avoidance goals in this model. The 5.9% of the variance in introjected regulation was explained by other-avoidance goals. The 9.5% of the variance in amotivation was explained by task/self-approach goals. The standardized estimates, 95% CI, and p values for direct, indirect, and total effects are shown in Table 6.

2.3.6.1 Achievement goals and motivational regulations as predictors

In Figure 6, the parameters were also statistically significant ($p < .05$), and non-significant values were not presented. All solid paths were significant. Intrinsic regulation and amotivation positively predicted MVPA. However, achievement goals, overall, did not predict MVPA with any statistical significance.

2.3.6.2 Motivational regulations as mediators

Direct effect. As shown in Figure 6, all direct effects were statistically non-significant, all indirect effects of only task/self-approach goals on MVPA were statistically significant.

Indirect/Mediated effect. Intrinsic regulation fully mediated the relationship between task/self-approach goals and MVPA. Amotivation was a complete negatively mediator of the relationship between task/self-approach goals and MVPA.

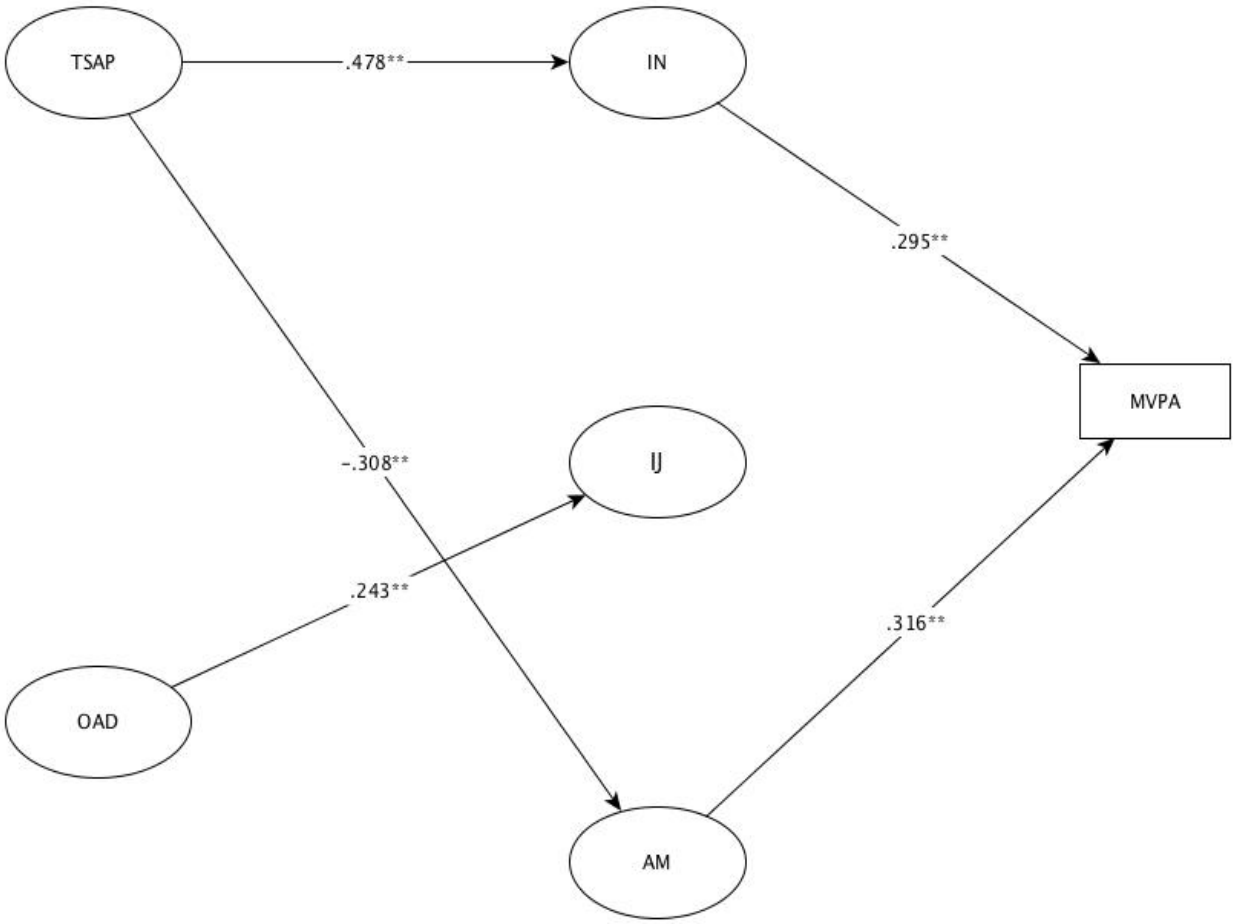

Figure 6. Results of structural equation modeling with accelerometer data. *Note*. $N = 217$. TSAP = task/self-approach goals, OAD = other-avoidance goals; IN = intrinsic regulation, IJ = introjected regulation; AM = amotivation; MVPA = moderate to vigorous physical activity. *$p < .05$, **$p < .001$.

Table 6. Standardized estimates, 95% CI, and p values for direct, indirect, and total effects with accelerometer data

Effects	Estimate	95% CI	*p*
Direct effects			
TSAP → IN	.478	[.317 .639]	< .01
TSAP → AM	-.308	[-.462 -.153]	< .01
OAD → IJ	.243	[.070 .416]	< .01
IN → MVPA	.295	[.148 .441]	< .01
AM → MVPA	.316	[.155 .476]	< .01
Indirect effects			< .01
TSAP → IN → MVPA	.141	[.065 .217]	< .01
TSAP → AM → MVPA	-.097	[-.178 -.016]	< .01
Total effects			< .01
TSAP → MVPA	.044	[-.031 .119]	> .05
OAD → MVPA	.030	[-.017 .077]	> .05

Note. TSAP = task/self-approach goals, OAD = other-avoidance goals; IN = intrinsic regulation, IJ = introjected regulation; AM = amotivation; MVPA = moderate to vigorous physical activity.

2.3.7 Content Analysis of Interview Data

A total of 53 students were interviewed individually. Their demographics and means of achievement goals are presented in Table 7. The interview data provided in-depth information about perceived experiences/factors that contributed to students' achievement goal endorsement in PA classes. In this section, themes emerged from the first three interview questions were first reported, followed by findings from questions 4 and 5, respectively.

Table 7. Characteristics of interviewees ($N = 53$)

Characteristics	N	Percentages (%)	Mean	*SD*
Age	53	-	20.110	1.410
Gender				
Male	32	60.377	-	-
Female	21	39.623		
Classification				
Freshman	7	13.208	-	-
Sophomore	18	33.962	-	-
Junior	7	13.208	-	-
Senior	21	39.623	-	-
Ethnicity				
Caucasian-American	37	69.811	-	-
Hispanic-American	10	18.868	-	-
African-American	1	1.887	-	-
Asian-American	3	5.660	-	-
Achievement goals				
Task/self-approach goals	53	-	5.727	.789
Other-approach goals	53	-	4.019	1.611
Task/self-avoidance goals	53	-	4.887	1.122
Other-avoidance goals	53	-	4.233	1.552

2.3.7.1 Questions 1, 2, and 3

These questions tapped into general goals that students pursued or approaches they took in their physical activity classes. A total of 525 unit cards were generated by 53 students' responses to the three interview questions. Four themes emerged: (a) motivators inherent to the classroom environment, (b) learning and improving, (c) health-related benefits, and (d) external motivators. Additionally, three subcategories for the first theme included *(a) classroom interactions*, *(b) fun/enjoyment*, and *(c) the activity itself.* Of the total, two cards did not contribute to any theme and were discarded. These themes, subcategories, and their corresponding frequencies and percentages are summarized in Table 8, and are presented below.

Table 8. Frequencies and percentages of themes and subcategories emerged from interview questions 1, 2, and 3

Themes & subcategories	Number of responses (n = 525)	Percentages
Motivators inherent to the classroom environment		32.952%
Classroom interactions	88	
Fun/enjoyment	68	
The activity itself	17	
Learning and improving	162	30.857%
Health-related benefits	104	19.810%
External motivators	80	15.238%
MISC (2)	2	.381%
Dead-end	4	.762%
Total responses	525	

Motivators inherent to the classroom environment. The first emergent theme generated 32.95% of responses to the questions. This theme reflected students' motivation based on intrinsic interest in doing the activity as well as peer or instructor influences. Three sub-categories emerged: classroom interactions, fun/enjoyment, and the activity itself.

Classroom interaction. The first subcategory captured important social interactions contributing to classroom activities and social skills. Students received positive feedback and constructive criticism from their instructors regarding their performance as well as suggestions for improvement. For example, Cole (M, senior) stated, "Well first, I think Jorge, he's our instructor, he's good at kickboxing. He knows it really well, and he can also explain it in, break it down to small terms, small steps to do correct exercise to get like spinning back kick." William (M, sophomore) speculated that "Like there is people who took the class in the past and there is people who are actually on the rugby team. So, they help me out a lot like passing and running and like communication with each other."

Students were also influenced by direct or indirect encouragement from classmates while building friendly relationships. For example, Kaitline (F, senior) noted, "Everyone is very nice and sometimes the workouts are very hard, and you get tired but everyone is just there cheering you on," Ronald (M, junior) indicated that, "I would like to take this class. I had another buddy and I'm in it."

Fun/enjoyment. Students found delight and excitement in their physical activity classes. More specifically, some of students considered that playing with peers would lead to more fun. Initially, Alexandria (F, senior) took volleyball because, "My goal is really just to have fun, I mean I love volleyball and it's uh a fun sport to be able to play, especially in this course, we get to play on teams, we get to go against each other so that's really fun." Also, Cooper (M, senior)

enrolled in soccer because "I wanted to take a kinesiology class that I would enjoy it. Kinesiology that would further me."

The activity itself. The third sub-category was attractive to some students. For example, Luenn (F, senior) took a soccer intermediate class because "I really do like soccer," while Hannah (F, senior) enrolled in handball "Mostly just because I have never played handball before." Receiving university credit was seldom important to either Ronald (M, junior) who "Just took it [Basketball] extra elective" or Christopher (M, sophomore) who indicated that Cardio-Kickboxing was "not required to graduate."

Learning and improving. 30.857% of the responses formed the second theme, which reflected students' desire to learn and develop during the immediate class as well as a desire to continue leaning after the class ended. The theme captured students' desire to acquire knowledge about the activity levels and enhance their skill.

For example, Julia (F, senior) said that, "I guess just to learn the basics of kickboxing," while Jonathan (M, sophomore) who indicated that, "My goal for this class is to just to increase my skills as a fighter." Other students wanted to try and learn a new activity. For example, Sophia (F, freshman) took pilates-barre because "My goal is to learn the different exercises, what the muscles to use and do them to best my ability," while Jonathan (M, sophomore) joined in Judo because "I just wanted to do something that I have not done before. So, I haven't done Judo before." Some of students in this theme considered that they focused on learning skill in order to continue to work out in the future. For example, Morgan (F, senior) took pilates-barre because "I want to do this after I graduate," or Andrew (M, sophomore) who speculated that, "I mean maybe like join a team at the end of it, that would be really cool."

Health related benefits. The third theme was accounted for by 19.81% of responses. This theme captured students' interest in maintaining physical and mental health. Physical health involved working out and being active to maintain overall physical fitness. For example, Elizabeth (F, senior) responded that, "Mostly I want to improve my cardiovascular health." Luke (M, sophomore) said "My goal is just to pretty much get a good workout." On the other hand, students emphasized the importance of activity to alleviate stress. For example, Michael (M, sophomore) enrolled in Racquetball because "I want to take this class to get my mind off the school work," and Kayla (F, junior) indicated that, "good stress reliever duration the year since I'm taking a lot of heavy course." Kevin (M, freshman) said that, "and then secondly, I've heard from several people that racquetball and fun classes like that help you with self-esteem." Similarly, Kristen (F, sophomore) enrolled in cardio-kickboxing to promote mental and physical health by actively moving in order to perspire, simply, "I love like doing activities and sweating so."

External motivators/influences. The final theme examined accounted for 15.24% of responses. Students' motivations for taking PA classes included outside factors such as required classes, previous experience and a competitive environment. As a graduation requirement for some students, the classes were essential for improving grades. For example, receiving university credit was important to both Kevin (M, freshman) said, "So, my main reasoning was first off to have a class that I knew I could get an A in so help with my GPA," and Christine (F, senior) who indicated that "Well, I have to take a physical activity for credit."

Students' past experience also contributed to their current class enrollment. For example, Ricardo (M, junior) just wanted to take handball class because "And I've played it before."

Luenn (F, senior) also took soccer because "I started playing in middle school and I went on to high school and I want to keep [on] in college."

The competitive environment present in many classes contributed to class attractiveness. Many students welcomed the opportunity to demonstrate superiority by beating peers. For example, Jordan (F, sophomore) said that, "I think what helps is my roommate was in the same class, we're both in it, so we both like competing each other." Austin (M, junior) also stated, "Obviously, I want to be the best in the class." Josh (M, freshman), who endorsed high other-approach goals, said, "I really like to compete, I always have so whenever I'm really motivated whenever I go to class and win, it means a lot to me."

Lastly, only one student mentioned effort as a contributor to his physical skills. Effort here referring to the amount of work exerted in class. For example, Jason (M, freshman) indicated that "Usually I try to put my heart into everything I do."

2.3.7.2 Question 4

The purpose of this question was to investigate why students agreed/disagreed with one of the four achievement goals. A total of 201 unit cards were compiled from responses provided by these 53 students. Five themes emerged: (a) the role of comparison/competition, (b) emphasis on learning and improving, (c) internal motivators, (d) benefits of correct technique, and (e) maximizing effort. Three of these themes contained subcategories. The role of comparison/competition included (*a) focus on self*, *(b) competition as important or not*, and *(c) comparing performance to others or being the best*. Subcategories for internal motivators included *(a) being physically active* and *(b) having fun*. Subcategories for benefits of correct technique included *(a) learning and improving*, *(b) safety*, and *(c) better workout*. Of the total,

three cards did not contribute to any theme and were discarded. The number of each group and these categories, frequencies, and percentages is presented in Table 9.

Table 9. Frequencies and percentages of themes and subcategories emerged from interview question 4

Themes & subcategories	Number of responses (n = 201)	Percentages
The role of comparison/competition		41.791%
Focus on self	34	
Competition as important or not,	31	
Comparing performance to others or being the best	19	
Emphasis on learning and improving	33	16.418%
Internal motivators		15.423%
Being physically active	21	
Having fun	10	
Benefits of correct technique		12.438%
Learning and improving	12	
Safety	7	
Better workouts	6	
Maximizing effort	19	9.453%
MISC (2)	2	.995%
Dead-end	7	3.483%
Total responses	201	

The role of comparison and competition. The majority of responses (41.791%) focused on the role of comparison and competition. The primary theme generated by students was the difference between types of comparison, which describes students who used their own performance or the performance of others to see their development, and competition, which describes students who see themselves in a contest with others. Of the three subcategories, *focus on myself* and *competition as important or not* accounted for the majority of responses (40.476% and 36.905%, respectively).

Focus on self. Students mainly focused on their own improvement instead of comparing themselves to others. Students were internally motivated to see betterment in their own performance and challenged themselves to continuously improve. Kaitline (F, senior) indicated "I am competing against myself better than I was yesterday." Sophia (F, freshman) said that "I was looking at myself. As long as I was doing well compared to what I did the week before then I would be content." On the other hand, some students expressed that they did not need to compare themselves with others. For example, Quinton (M, sophomore) responded "I didn't really sign up for the class to compare myself with others." Cole (M, senior) also made a statement in detail:

> Yea, because if you do [compare yourself to other people], if I'm always focused on other people and how—because some people—I'm at a different level of physical fitness than some other people that other people who are better physical fitness than I. So, if I compare myself to them, I can make myself feel really bad, because I'm not at this expert level or I can also make other feel bad, because like "wow, you are terrible, you can't even do a pushup or something."

Competition as important or not. The second sub-category refers to students' level of competitiveness. Some students were quite competitive and enjoyed competing others. First, they liked to compete with others and to be more successful. For example, Cooper (M, senior) said "My short-term goal was to get to the point where I can play and actually compete with my peers," and Josh (M, freshman) indicated "I just really enjoy competing with others." Some students did not like to lose in competition, such as Wyatt (M, sophomore) who said "I think it goes to how like it's the same as it sounds really bad, but it's just more I really don't like losing at all." Cameron (M, sophomore) also stated "Just because that's how I am. It's not fun losing."

In addition, competition represented an attribute that motivated students to observe others' performance and exceed their abilities. Laura (F, senior) elaborated "So, whenever, I'm standing next to someone and I'm able to work harder or go faster or be stronger, that's a good motivation for me to do better." Jordan (F, sophomore) also indicated "I agree with those [other-approach goals], because what makes me good in sports is my competitiveness." A few students mentioned that competition was not essential in their physical activity classes to achieve their goals. For example, Morgan (F, senior) stated "And in this class, it's not competition against everybody else," and Jessica (F, sophomore) said "So, it's the same with the class, like I'm not trying to be able to defeat everybody in the competitions."

Comparing performance to others or being the best. Students enjoyed the challenge and excitement of comparing them perform to that of their peers. For example, Ricardo (M, junior) said "I guess it has to go again with my competitive aspect, just trying to do better than my other classmates." Nathan (M, junior) stated in more detail:

> Usually, I pick someone that is in the same position as me that like because we have like set positions. So, I like watch someone, if they are really good at playing the same position as me and see if they do it right.

Other students who compared their performance to other people were trying "to be the best" and better than themselves. For example, Jordan (F, sophomore) said "So, and then against myself, so it helps like made me want to be better than everyone else and then like try to outperform." Austin (M, junior) also directly said "Anything I do well, I want to be the best." However, Christine (F, senior) was afraid of performing worse than others. She said "So, sometimes when I'm doing physical activities either in a class or just sort of on my own in public places, I get kind of worried that I'm not very good at it compared to other people."

Emphasis on learning and improving. The second theme was identified by the student's desire to learn or develop skills in physical activity and accounted for 16.418% of responses. Learning is attaining information about new physical activities, and further developing skills they have a fundamental knowledge of. For example, Haru (M, senior) said that, "I'm not a Kinesiology major and I'm doing this to learn the basics." Additionally, Cooper (M, senior) stated:

> So, since I had no idea how to play, and still pretty much I don't know how to play soccer really well. Anyway, I'm coming from not being able to play with my classmates at all because they are just leagues above me, so like I'm trying to close that gap.

In general, a number of students wanted to focus on doing better in their physical activity skills than they had before. Giorgio (M, sophomore), who took a racquetball beginner class, indicated, "Exactly, just getting better than I previously have done, you know." Jessica (F,

sophomore) also said, “Well I’ve never really wanted to compare myself to other people, so I was more like trying to do better than like I did yesterday.” Specifically, a student wanted to get better in order to avoid a decrease in skill levels. Hope (F, sophomore) explained that, “And wanted to, I did not want to have a performance decline.”

Internal motivators. The third emerged theme focused on feelings of physical and mental well-being as well as personal enjoyment. This theme accounted for 15.423% of responses. The emergent theme expressed students’ achievement goal endorsements in PA classes. Their achievement goals were influenced by internal factors. The two subcategories included *being physically active* and *having fun*, 67.742% and 32.258%, respectively.

Being physically active. The first subcategory referred to students wanting to get a good workout, to stay fit or in shape, and to relieve stress. For example, Kendra (F, senior) indicated that, “I guess I’ve started that I should probably start to pay more attention to my wellness and all that.” Jordan (F, sophomore) also said, “So, once I started working out more, I found it [extreme-fitness] as like a stress relief.” More specifically, a student mentioned that physical activity was more important than skill acquisitions. Natalie (F, senior) said:

> You know as opposed to, I joined the class more to just have the opportunity to run up and down the court, as opposed to work just on like form of shooting. So, the movements themselves were not very important to me.

Having fun. The second subcategory indicated that students were making a commitment to classes for enjoying themselves and valuing their enjoyment over other factors, such as skills, performance, and rules. For example, Kristen (F, sophomore) certainly said, “My goal is just to have fun,” and Chrisian (M, junior) stated, “I knew it was naturally going to happen that there

would somethings that I would do better but at the same time I just wanted to have fun." Additionally, Michael (M, sophomore) explained:

> So, like I said, racquetball, I know there are skills and techniques behind the movements and the swings and I've played tennis before and I'm actually a lot bigger on tennis but I'm not really too concerned with actually perfecting my technique. I usually play sports to have fun, I'm never going to be amazing at them. As far as missing opportunities to learn what is taught in this class, it only takes someone two minutes to explain the rules. I didn't take it for whole semester to just learn the rules, I just wanted to have fun and compete, exercise and keep myself in shape.

Benefits of correct technique. The fourth theme, which focused on students desire to perform correctly for skill mastery and injury prevention, accounted for 12.438% of responses. Specifically, this theme focused on three subcategories of benefits, such as *learning and improving* (48% of responses), *safety* (28% of responses), and *better workouts* (24% of responses). It is important to pay attention to how students correctly perform physical activity.

Learning and improving. Students desired to perform physical activities right for mastery of skills and development of skills. For example, Christopher (M, sophomore) explained, "I guess the goal would be to not do things incorrectly, or if I'm going to do something, then make sure that I'm doing it right so I can learn properly." Another student, Jonathan (M, sophomore) said, "So, if I, through repetition—If I continue, say, do all the techniques and movement correctly, hopefully I'll [get] better at them."

Safety. Correct technique was an essential to students for preventing injury and protecting their bodies. For example, Julia (F, senior) said:

> I think especially, I mean for all sports, but mainly kickboxing, it's so easy to hurt yourself if you do something wrong. I mean something simple, if you just aren't holding your hand right when you hit something, I mean you could hurt your finger or wrist.

Luke (M, sophomore) also indicated, "Obviously, it's one of these things, I feel like it's KINE class where you can easily kind of, injure yourself, definitely hurt yourself just by punching strangely or kicking strangely." In particular, students focused on doing movements correctly because they had experienced injuries before. Gaby (F, senior) stated:

> Absolutely, for the first one, I would say that I agree with it because I have heard that previous students taking this class for some reason if you're not paying attention, one of them ended up getting nose broken and another one a knee injury.

Better workouts. Furthermore, some students wanted to do physical activities/movements correctly because they ensured a better workout. For example, Morgan (F, senior) said, "In fact, I found when I'm not thinking about anyone else around me, I get better workout and because I'm focusing on the movements within myself."

Maximizing effort. The final emerged theme examined accounted for 9.453% of responses. This theme captured students' desire to increase practice time and work hard for achievement in PA classes. Austin (M, junior) said, "Because I don't think there is a point in doing something if you're not going to try hard. I'm just giving a 110% whenever you can." Andrew (M, sophomore) also stated, "In my opinion, if I'm going to be doing something I'm going to commit my time or something then I can't just like go half speed of something. I have to try my hardest and best." Some students put in greater effort and performed their best because

they wanted to be effective members of the team and try to reach their goals. For example, Ricardo (M, junior) said, "I try to do a little better than teammates do. I just to show them that I am working hard and just to make them try as hard." Connor (M, senior) also said, "I guess it's just because I want to succeed." Additionally, other students made an endeavor because they wanted to consistently retain current skill levels. For instance, Marshall (M, senior) explained:

Handball, it's pretty easy to decline skill if you don't keep practicing. So, if you don't practice, you can't be really good and you don't have this for a month, then you're going to come back and not going to be as good.

Finally, two index cards were miscellaneous and did not fit into any theme. Only two students expressed that they focused more on social aspects of physical activity classes. Student were motivated to participate in physical activity classes to meet new people and make good relationships with peers. Their motivation was not necessarily related to the physical activity. Josh (M, freshman) said "And it's kind of funny because I ended up running into another guy who is from Corpus Christi also where I'm from." On the other hand, Dianne (F, 5th years) desired to made personal relationships within class which made her more confident in her abilities. She stated "But I think the teammates are really good because they're encouraging others to do well not just like 'don't mind if you make a mistake'."

2.3.7.3 Question 5

This question served as a follow-up on question 4 and focused on factors specific to physical activity classes that students might perceive to contribute to their endorsement of different achievement goals. Four themes, the first two themes with subcategories, emerged: (a) impact of learning environment, (b) influences of self and others, (c) learning and improving,

and (d) opportunity for physical activity. Subcategories for impact of learning environment included *(a) influence of instructor* and *(b) influence of peers*. Subcategories for theme two included *(a) internal motivation* and *(b) external motivation*. Table 10 summarizes the frequencies and percentages of the four themes that emerged from students' responses. Dead-end statements were not involved in the emerged themes.

Table 10. Frequencies and percentages of themes and subcategories emerged from interview question 5

Themes & subcategories	Number of responses (n = 113)	percentage
Impact of learning environment	5	30.974%
Influence of instructor	16	
Influence of peers	14	
Influence of self and others		26.549%
Internal motivation	20	
External motivation	10	
Learning and improving	22	19.469%
Opportunity for physical activity	15	13.274%
Dead-end	11	9.735%
Total responses	113	

Impact of learning environment. The first theme generated the highest percentage of responses (30.974%) to the interview question 5. The classroom instruction setting in physical activity classes can help students' performance and goal-orientation through the care and feedback from their friends and instructors. Two sub-categories emerged influence of instructors (45.714% of responses) and influences of peers (40% of responses).

The influence of instructors. This first sub-category was very important to students for correct performance. For example, Julia (F, senior) said that, "Yes, because the first time I hit something, I hit it wrong. And I hurt my hand. It was awful. And then I asked Jorge [instructor] about it and he told me what I was doing and then it was easier." Elizabeth (F, senior) made a statement in detail:

> I don't know if anything specific to this class, but the way that he [instructor] teaches, you know he pushes you to try when you are kind of doing on your own at the bags at the back of the room, he says 'try the spins, try the kicks, just try it out.' And then If I was so focused on 'oh I don't want to do those wrong,' I probably wouldn't try them, because if I don't do it all, I definitely won't get it wrong. But I don't do it all, I won't get it right either, so I think that's, that exercise in that motivation from instructor as helped me kind of focus on the positives.

Influence of peers. The second subcategory played a crucial role in making students goal-oriented. For example, Cameron (M, sophomore) pointed out that, "Probably the fact that my roommate was with me. I played with him a lot." Effective feedback from peers also contributed to skill development. For example, Jonathan (M, sophomore) indicated "Everyone teaches each other, so if I was doing the wrong movements my partner would probably tell me, 'okay this

isn't right, you should do this instead,' and I think everyone in class is like that." On the contrary to these responses, a student made endorsement her goal-oriented because her movement/performance impact on her team or herself. For example, Alexandria (F, senior) said:

> I play setter, so every single paly as long as I can get the ball to where I can run to it in time and get to the ball, I would set the ball to a hitter. So, if I'm not doing, if I'm not setting the ball in a good spot for somebody to hit it, then we cannot make a play.

Influence of self and others. The second emerged theme accounted for 26.549% of responses. The theme reflected students' interest based on factors not inherent to the classroom. Two sub-categories included internal motivation (66.667% of responses) and external motivation (33.333% of responses).

Internal motivation. The first subcategory included self-comparison and intrinsic interest. Students in this sub-category tended to compare themselves to others but avoided competition because they knew their classmates might have different skills and physical ability. For example, they mentioned that avoiding performing poorly relative to peers was not important. Luenn (F, senior) said:

> I don't think so. I mean I see other people compare, you know each other like they are very competitive and they want to do better than others. But, I mean, that's not the way I am. That is the only thing I see, but not really that anything that made me disagree with it [other-avoidance goal].

And, Medeline (F, sophomore) explained "Yes actually. In Pirates-Barre, there is a lot of movement in terms of how high you can kick and how flexible people are. So, that's not necessarily deciding factor how fit you are but everybody is different."

In addition, other students did not worry about comparisons or academic requirements but rather focused on personal pleasure. For example, it was not necessary for Morgan (F, senior) to take Pilate-barre to graduate. She said, "I think it's just the structure of any class that is not required. So, for some students, this class is required as one of their 199, but I think for the majority of us, it's not required." Also, Michael (M, sophomore) who enjoyed the class but did not take it for graduation requirement, said "That [graduation requirement] doesn't really influence me, my motors kind of set before I started this class. I don't think this class has changed how I feel. I mean I've definitely had a lot, it had been a lot funner [sic] than previously thought."

External motivation. The second subcategory came from a desire to measure progress against peers. Some students desired being with friends so they could compete against them. For example, Austin (M, junior) said that, "I think that helped me wanting to outperform others." Competing with each other really influences students. Cameron (M, sophomore) said that, "So, just wanting to beat him (roommate) mainly." Also, Michael (M, sophomore) stated that, "Not really. I just go in there to play against someone."

Learning and improving. The 19.469% of responses comprised learning and improving theme. This emergent theme focused on mastering skills, learning, and understanding underscored students desire to be more goal-oriented. Students responding in this theme wanted to join in physical activity classes for learning skills and getting better. For example, Jessica (F, sophomore) said, "In this one, we learn different skills. In the beginning, we'd learn falls and right now we're learning arm bars and stuff," and Quinton (M, sophomore) also indicated, "Not really, it was just myself wanting to get better. Nothing in this class made me disagree with them." In addition, Kaitline (F, sophomore) said in the cardio-kickboxing class:

> I don't know, I guess at the beginning of the class, Jorge (instructor) kept saying it was just going to get harder and harder. So, by the time we took this questionnaire, I just wanted to do better than like the first week of the class.

***Opportunity for physical activity*.** The final theme accounted for 13.274% of responses. The theme captured students' desire to engage in physical activity. For example, Marshall (M, senior) responded "Yea, participating, playing every day, it made me not decline my performance." Morgan (F, senior) said "I think it's just the access to workout classes that are interesting to me." Additionally, some students took advantage of opportunity for practice and repetition in their PA classes because it helped close performance gaps between themselves and their goals. For example, Connor (M, senior) said, "Yea, well just like I said before just playing making sure that I getting a lot of practice in it, and really utilize it." Luke (M, sophomore) also indicated "That is because of just repetition and also having a teacher, make sure that you do the movements correctly."

2.4 Discussion

Guided by the 3 × 2 achievement goal model (Elliot et al., 2011) and self-determination theory (SDT; Deci & Ryan, 1985, 1991), the current study attempted to answer four research questions described below. Accordingly, data were collected through questionnaires, accelerometers, and interviews. In this section, all results are discussed around the four questions and then concluded with implications for limitation, practical applications, and future research.

Research Question #1: What Are the Psychometric Properties of the 3 × 2 Achievement Goal Questionnaire (3 × 2 AGQ) and the Behavioral Regulation in Exercise Questionnaire-3 (BREQ-3) among American College Students in PA Classes?

The first research question explored the psychometric properties of the 3 × 2 AGQ and the BREQ-3 among college students enrolled in PA classes. As reviewed earlier, Elliot and colleagues proposed the 3 × 2 achievement goal model to understand motivation and related students' outcomes, such as exam performance, learning efficacy, and intrinsic motivation in academic settings (Elliot et al., 2011). This model illustrates the crossing of the definition and valence components of competence. The definition component of competence is evaluated using three standards: task-based, self-based, and other-based standards of evaluation. The valence component of competence is conceptualized two ways: approach and avoidance tendencies. The two components interact resulting in six achievement goals: task-approach goals, task-avoidance goals, self-approach goals, self-avoidance goals, other-approach goals, and other-avoidance goals.

To assess this six-factor model of achievement goals, Elliot and colleagues developed the 3 × 2 AGQ (Elliot et al., 2011) and tested it with a sample of college students from Germany and the United States. Results of confirmatory factor analyses (CFA) and Cronbach's alpha analyses supported the structural validity (also known as factorial validity) and reliability of the 3 × 2 AGQ in an academic setting. Other achievement goal research work provided additional evidence that the 3 × 2 AGQ demonstrated acceptable psychometric properties in academic and sport settings. (e.g., Elliot et al., 2011; Johnson & Kestler, 2013; Mascret et al., 2011, Ning, 2016; Wang et al., 2017).

In the current study, results of the CFA revealed an acceptable fit between the model and data when students' achievement goals were measured by the 3 × 2 AGQ. But examination of correlations between achievement goals as latent variables revealed high correlations between task-approach goals and self-approach goals (r = .952) and between task-avoidance goals and self-avoidance goals (r = .934). These high correlations suggest that task-approach goals were not distinguishable from self-approach goals and task-avoidance goals were not distinguishable from self-avoidance goals among this sample of college students in a context of PA classes. Given these results, in a second CFA, the task-approach goals and self-approach goals were combined and labeled the task/self-approach goals, the task-avoidance goals and self-avoidance goals were combined and labeled the task/self-avoidance goals, and other-approach goals and other-avoidance goals remained intact. In other words, a four-factor model of achievement goals was proposed and tested. All the fit indices (χ^2/df, CFI, TLI, RMSEA, and SRMR) and factor loadings were similar to those of the six-factor model of achievement goals. AIC and BIC were also computed and compared. They were similar for both models. However, correlations between the four achievement goals as latent variables were all lower than .85, indicating that task/self-approach goals, task/self-avoidance goals, other-approach goals, and other-avoidance goals were distinct from one another in the four-factor model of achievement goals. Additionally, Cronbach's α coefficients revealed acceptable internal reliability of these four achievement goal scores. Considered together, the four-factor model of achievement goals fit the data better than the six-factor model of achievement goals in the current study.

The finding that the 3 × 2 AGQ failed to measure achievement goals as described in the 3 × 2 model of achievement goals (Elliot et al., 2011) did not follow the expected theoretical model but are supported by previous studies conducted in college academic and sport settings

(e.g., Elliot et al., 2011; Johnson & Kestler, 2013; Mascret et al., 2015; Wang et al., 2017). Two possible explanations could account for this unexpected result. One could be that while testing the 3 × 2 AGQ, Elliot et al. (2011) focused on the structural validity of the 3 × 2 AGQ with no consideration of discriminant validity. Discriminant validity refers to the extent to which a latent variable is differentiated from other latent variables. Discriminant validity requires that "a test not correlate too highly with measures from which it is supposed to differ" (Campbell, 1960, p. 548). In order to establish discriminant validity, there is need to analyze the correlation coefficients between latent variables. Elliot and colleagues did not examine latent variable correlations between the six achievement goals as delineated in the 3 × 2 goal model. Without such information, it is not clear whether the six achievement goals measured by the 3 × 2 AGQ are distinguishable from one another in CFAs. The current study took the additional step of examining the discriminative validity of the 3 × 2 AGQ in addition to its structural validity. Obtained from CFAs, correlations between the six achievement goals as latent variables did not support that the 3 × 2 AGQ had discriminative validity. When the task-approach goal and self-approach goal were combined and the task-avoidance goal and self-avoidance goal were combined, results of CFAs supported both the structural and discriminant validity of the 3 × 2 AGQ as a measure of four achievement goals.

A second possibility could be that the task-approach and task-avoidance goals may be considered "tasked-based goals" because they use the absolute demand of the task for competence evaluation. Conversely, self-approach and self-avoidance goals considered as "self-based goals" because they use intrapersonal comparison for competence evaluation. Though Elliot and associates (2011) proposed the separation of task-based and self-based goals in the 3 × 2 achievement goal model, they acknowledged the conceptual similarity between these two kinds

of goals as they noted, "Conceptually, task- and self-based goals are similar in that both have an evaluative standard that may be used privately and at one's own discretion in the acquisition of competence information" (p. 633). More recently, Elliot (2017) indicated that task- and self-based goals could be correlated goal constructs (A. J. Elliot, personal communication, December 18, 2017). Indeed, with a sample of university athletes in Singapore, Wang et al. (2017) observed high correlation patterns of latent variables between task-approach goals and self-approach goals (r = .87) and between task-avoidance goals and self-avoidance goals (r = .74). Therefore, both conceptualization and empirical evidence point out a possibility that task- and self-based goals may not emerge as distinct goal constructs. This possibility was corroborated in the present study. The task-approach and self-approach goals emerged as a single goal construct and the task-avoidance and self-avoidance goals merged into one goal construct.

Like the 3 × 2 AGQ, the psychometric properties of the BREQ-3 were examined in Research Question 1. Situated in SDT and evolved from the BREQ and BREQ-2, the BREQ-3 assesses six motivational regulations: intrinsic regulation, integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation. Results of the CFA revealed a marginal fit between the six-factor model and data. This prompted the examination of modification indices, that led to the removal of the item, "I get restless if I don't participate regularly," an identified regulation from the questionnaire. The second CFA on the remaining 23 items generated a good fit between the six-factor model and data. Factor correlations indicated the six motivational regulations represented six distinct constructs in the data. Moreover, Cronbach's internal consistency analysis revealed all six motivational regulations subscales had Cronbach's αs greater than .70. Together, these results provided empirical evidence that the

BREQ-3 (after removal of item 12) reliably and validly assessed the six motivational regulations in this setting.

Previous studies made similar observations on items assessing identified regulation (e.g., Liu et al., 2015; Chung & Liu, 2012; Markland & Tobin, 2004; Moustaka et al., 2010; Riiser, Ommundsen, Småstuen, Løndal, Misvær, & Helseth, 2014). One possible explanation offered by Cid, Moutao, Leitao, and Alves (2012) and Riiser et al. (2014) was that the word 'restless' has a negative connotation. As such, it may be understood as referring to introjected regulation. That is, students associated lack of physical activity with feelings of guilt or failure, which resulted in physiological restlessness. The BREQ-3 assesses the identified regulation by such items as, "I feel guilty when I don't exercise, I feel ashamed when I missed an exercise session, I feel like a failure when I haven't exercised in a while, and I would feel bad about myself if I was not making time to exercise." Apparently, all of these items are centered on negative feelings associated with not exercising. In the case of the current study, "I get restless if I don't participate regularly" was also found to cross-load on introjected regulation, in addition to amotivation, external regulation, and intrinsic regulation. Future research is recommended to replace the word 'restless' with a positively phrased word when seeking to refine measures of identified regulation.

Research Question #2: What is the Predictive Power of Achievement Goals and Motivational Regulations in Students' Achievement/Educational Outcomes?

The second research question investigated the prediction of achievement goals and motivational regulations in students' achievement/educational outcomes. Correlations showed four achievement goals and more self-determined motivation (e.g., intrinsic regulation,

integrated regulation, and identified regulation) were positively related to students' persistence/effort, enjoyment, and perceived health. Other-approach goals and other-avoidance goals were positively correlated with MVPA. In addition, introjected regulation was positively correlated with persistence/effort and enjoyment, but amotivation was negatively correlated with persistence/effort and enjoyment.

Such correlations were further tested in SEM analyses in terms of predictions. Results revealed task/self-approach goals were significantly positive predictors for persistence/effort, enjoyment, and perceived health, suggesting that students whose goals were to master learning tasks and improve themselves were more likely to persist in and put forth effort in their physical activity classes, enjoy those classes and consider their health good than those students who did not endorse task/self-approach goals. This finding is consistent with previous studies in academic and sport settings (Elliot et al., 2011; Johnson & Kestler, 2013; Mascret et al., 2015). Elliot et al. (2011) reported that task-approach goals were positive predictors of intrinsic motivation, learning efficacy, and absorption in an academic class. Mascret et al. (2015) found both task-approach goals and self-approach goals to be positively related to intrinsic interest among university students in a sport setting. Together, these findings point out that task-approach goals, self-approach goals, or task/self-approach goals are motivationally beneficial for college students across academic, sport, and PA settings. Our sample was no exception.

Other-approach goals were found to be a positive predictor for perceived health, indicating students who desired to outperform others in their physical activity classes tended to view their health as better than students who did not endorse this goal. In their study with a sample of college students in a sport setting, Mascret, Elliot, and Cury (2015) reported that other-approach goals emerged as a positive predictor of perceived competence. Several other studies,

conducted with samples of college students, also found that other-approach goals positively predicted perceived competence and self-reported persistence/effort in college academic, sport and PA settings (Elliot & Harackiewicz, 1996; Gao et al., 2012; Lochbaum, Bixby, Wang, 2007). Considered together, these results show that other-approach goals can predict some positive outcomes in sport and PA settings, providing additional evidence to support achievement goal theories that the pursuit of other-approach goals are posited to elicit positive processes and outcomes (Elliot, 1999).

Unlike other-approach goals, other-avoidance goals, which are defined as the avoidance of incompetence relative to others, may negatively predict or fail to predict students' achievement/educational outcomes. For example, Johnson and Kestler (2013) reported that other-avoidance goals negatively predicted students' academic achievement (assessed via cumulative GPA). The current study also revealed that other-avoidance goals were a negative predictor for perceived health. Students who endorse other-avoidance goals are likely to see achievement settings as a threat to their perceived ability (Elliot & Harackiewicz, 1996) that, in turn could result in negative responses to a host of cognitive, affective, and behavioral outcomes such as perceived competence, enjoyment, and engagement.

Similar to achievement goals, motivational regulations are theoretically expected to predict students' achievement/educational outcomes. Results partially supported the theoretical prediction as integrated regulation and identified regulation emerged as positive predictors of persistence/effort, intrinsic regulation was found to significantly and positively predict enjoyment. Integrated regulation was found to positively predict perceived health. Although integrated regulation emerged as a positive predictor of persistence/effort, it appeared that identified regulation was a stronger predictor for this outcome. While this finding is not in line

with SDT that integrated regulation is more self-determined and intrinsic than identified regulation and thus possesses more predictive power in positive outcomes (Deci & Ryan, 1985, 1991), it provides further empirical evidence that college students' motivation for PA is more extrinsic than intrinsic (Egli, Bland, Melton, & Czech, 2011).

As a more self-determined motivation form, integrated regulation is assumed to positively predict enjoyment. However, it emerged as a negative predictor of enjoyment in this study. This finding also contradicts previous findings that intrinsic regulation and integrated regulation were both significantly positively related to exercise effort and interest (Li, 1999). Given that integrated regulation has been much less researched compared to other motivational regulations in college PA settings and inconsistent results, it would be premature to make any definitive conclusions regarding the predictive role of integrated regulation in students' enjoyment in the present study. Future research is recommended to further clarify the role integrated regulation plays in predicting achievement/educational outcomes among college students in physical education/PA settings.

Finally, SEM analyses on the achievement goals and motivational regulations as predictors of MVPA revealed the four achievement goals did not significantly predict college students' MVPA during their PA classes. The current study is not the only study that revealed no prediction of achievement goals in outcomes that were assessed objectively. Solmon and Boone (1993) examined the impact of mastery and performance goals (as conceptualized in the dichotomous model) on learning outcomes in college PA classes. Students' choice of challenging tasks was assessed by self-evaluations, perceived involvement in the class (e.g., interest, attitude, and level of attention) by questionnaires, in-class behavior by observations, and achievement (from pre- and posttest) by a skill test. While canonical correlation analysis showed that mastery

goals were positively and performance goals were negatively related to selection of more challenging tasks and higher levels of perceived class involvement, stepwise multiple regression analysis revealed the two goals failed to predict achievement. Given these findings, Solmon and Boone speculated that the relationship between achievement goals and student achievement may not be a direct one; there might be additional mediators in this relationship.

On the other hand, intrinsic regulation and amotivation were found to positively predict MVPA with this university population. Among the six motivational regulations, intrinsic regulation is viewed as the most self-determined motivation. Intrinsically motivated people engage in physical activity because it is inherently enjoyable and pleasurable. A great deal of research documents that intrinsic regulation positively predicts cognitive, affective, and behavioral outcomes, including behavioral persistence, intensity, and frequency of exercise behavior (e.g., Pelletier, Fortier, Vallerand, & Brière, 2001; Ryan & Deci, 2007; Standage et al., 2008; Vallerand & Bissonnette, 1992). The positive prediction of intrinsic regulation in students' MVPA observed in the current study adds additional evidence to this research work.

Perhaps the most unexpected and perplexed result emerged from the current study was that amotivaton was found to positively predict MVPA, suggesting that students who recorded higher on amotivaion scores demonstrated greater MVPA than those students who recorded lower scores on amotivation. Associated with the lowest level of self-determination, amotivation is characterized by feelings of incompetence, lacking intentionality of behavior, and performing without purposes (Deci & Ryan, 1985, 1991; Ryan & Deci, 2000). As such, amotivation is theoretically assumed to have negative correlations with desirable achievement/educational outcomes. While considerable research work supports this assumption (Daley & Duda, 2006; Markland, 2009; Thøgersen-Ntoumani & Ntoumanis, 2006), there is no empirical evidence that

amotivation was significantly related to less MVPA (Wilson et al., 2004). Also, it is important to note that students in this study, as a whole, didn't consider themselves amotivated in PA classes as the mean of amotivation was 1.37, far below the midpoint of 4 on a 7-point Likert scale (1 - *Not at all true of me*; 7 - *Extremely true of me*). In other words, this mean score indicated that they didn't agree that the four statements (e.g., I don't see why I should have to participate) that measure amotivation truly described them while participating in PA classes. Future research is needed to determine if this finding can be replicated with other populations of American college students in PA settings.

Research Question #3: Do Motivational Regulations Mediate the Relationships between Achievement Goals and Students' Achievement/Educational Outcomes?

The third research question addressed whether motivational regulations might mediate the relationship between achievement goals and achievement/educational outcomes. Research has documented the mediation of motivational regulations in relationships between achievement goals and achievement/educational outcomes in a number of settings, including recreational exercise, sport, and physical education settings (Biddle et al., 1999; Georgiadis et al., 2001). However, such mediation has not been extensively examined in studies employing the 3 × 2 goal model. Therefore, the current study was designed to address this issue.

As revealed by results of SEM, intrinsic regulation partially mediated the relationship between task/self-approach goals and enjoyment; integrated regulation partially mediated the relationship between task/self-approach goals and persistence/effort, the relationship between task/self-approach goals and perceived health, and the relationship between other-approach goals and perceived health. Identified regulation partially mediated the relationship between task/self-

approach goals and persistence/effort. The results showed that mediation of motivational regulations in relationships between achievement goals and achievement/educational outcomes occurred in the context of this college PA context. Most importantly, more self-determined motivation (intrinsic regulation, integrated regulation, and identified regulation) mediated the relationships between task/self-approach goals, other-approach goals and achievement/educational outcomes. The finding is similar to that of Georgiadis et al. (2001) who found identified and intrinsic regulation mediated the relationship between task orientation and physical self-worth among a sample of adult exercisers. To maximize the positive impact of task/self-approach goals and/or other-approach goals on students' enjoyment, persistence/effort, and perceived health in college PA classes, instructors should therefore emphasize the intrinsic values of physical activity, create class climates where students find learning enjoyable and feel satisfied, and provide learning experiences that lead to competence-based learning goals. In particular, PA instructors should create a learning environment that highlights mastery learning to foster students' need for competence. Furthermore, instructors should apply a variety of autonomy-supportive instructional strategies that promote students' self-determined motivation. Such strategies might include actively listening to students' interests and goals, providing choice and opportunities for critical thinking and independent work, and utilizing positive language (Castelli, Barcelona, & Bryant, 2015; Haerens, Aelterman, Van den Berghe, De Meyer, Soenens, & Vansteenkiste, 2013; McBride & Xiang, 2004; Williams, Gagne, Ryan & Deci, 2002).

Another noteworthy result emerged from SEM is that introjected regulation partially mediated the relationship between other-avoidance goals and perceived health. As reported earlier, other-avoidance goals were found to negatively predict perceived health among these participants. In sport, physical activity and physical education settings, research examining the

mediation of motivational regulations in relationships between achievement goals and achievement/educational outcomes has been almost exclusively guided by the dichotomous achievement goal model where achievement goals are conceptualized as task- and ego-oriented (Biddle et al., 1999; Georgiadis et al., 2001). As a result, no information exists about mediation effects of motivational regulations in other-avoidance goals prior to the current study. Given this, further research is definitely needed to confirm or refute this issue.

Examining of the predictability of achievement goals on MVPA, revealed that none of the four achievement goals (task/self-approach, task/self-avoidance, other-approach, and other-avoidance) emerged as significant predicators. However, examination of the mediation of motivational regulations in relationships between achievement goals and MVPA revealed intrinsic regulation fully mediated the relationship between task/self-approach goals and MVPA. This result indicates that task/self-approach goals had an indirect effect on students' MVPA. In other words, to benefit from task/-self approach goals in college PA classes, students need to regulate their MVPA internally (i.e., intrinsic regulation). The result also supports Solmon and Boone (1993) who postulated that the relationship between achievement goals and student achievement behaviors may not be direct one.

Amotivation fully and negatively mediated the relationship between task/self-approach goals and MVPA. This result is not in line with achievement goal theory or SDT. Also, there is no empirical work to either support or refute such medication as revealed in the current study. Follow up research is recommended to more accurately determine the nature of amotivation as a mediator of achievement goals, motivational regulations and their relations to cognitive, affective, and behavioral outcomes in college PA settings.

Research Question #4: What Perceived Experiences/Factors Contribute to Students' Endorsement of Achievement Goals?

The final research question explored student perceptions that might account for their achievement goal endorsement. The first three interview questions (see Appendix M) were analyzed together because the questions asked about general goals and approaches the students took toward their PA classes. The fourth and fifth interview questions (see Appendix M) aimed for specific insights into why a particular achievement goal was (or was not) strongly endorsed in PA classes, so they were individually analyzed.

Findings from the first three interview questions show that students in the current study considered their general goals and approaches towards their PA classes primarily in terms of motivators, learning and improving, and health-related benefits. Motivators mentioned in students' interviews included classroom interactions, fun/enjoyment, physical activity itself, earning class credit, and meeting a graduation requirement. These motivators were similar to what was reported in previous research (Hildebrand & Johnson, 2001; Leenders, Sherman, & Ward, 2003; Weinfeldt & Visek, 2009), which found that college students participated in health/wellness and PA classes to have fun/enjoyment, be social, work out/exercise regularly, and earn credit.

Reflected in the *Learn and Improve* skills theme, many students indicated that they chose to take PA classes because they wanted to learn and improve physical activity/movement skills. Focusing on learning and improving is an important characteristic of task/self-approach goals. This result corroborated the questionnaire data that students scored high on the task/self-approach goal ($M = 5.79$) in the current study. It also supports Lackman, Smith, and McNeill

(2015), who found that college students were more likely to enroll in PA classes when their goals were to learn new skills and activities.

It has been well documented that physical activity is associated with a number of health benefits, such as improved cardiorespiratory and cardiovascular health, better muscular fitness, increased strength and endurance, and reduced depression (Office of Disease Prevention and Health Promotion [ODPHP], 2008). A great deal of research work reveals that individuals often cite health-related benefits as a major reason for them to participate in physical activity (Kilpatrick, Hebert, & Bartholomew, 2005; Lowry, Galuska, Fulton, Wechsler, Kahn, & Collins, 2000; Weinfeldt & Visek, 2009). Students in the current study were no different. Considered together, it appears that increasing awareness of physical activity-related health benefits could be an effective strategy to promote physical activity among college students.

The fourth interview question asked students why they agreed/disagreed with a specific achievement goal in an attempt to provide additional information to understand their achievement goal endorsement. In the 3 × 2 model of achievement goals (Elliot et al., 2011), competence can be defined in three distinct standards: task, self, and other (i.e., definition of competence), and it can also be valenced positively or negatively (i.e., valence of competence). The crossing of definition and valence of competence results in six goals: task-approach (focusing on achieving task-based competence), task-avoidance (focusing on avoiding task-based incompetence), self-approach (focusing on achieving self-based competence), self-avoidance (focusing on avoiding self-based incompetence), other-approach (focusing on achieving other-based competence), and other-avoidance (focusing on avoiding other-based incompetence). Though the questionnaire data showed that students in the current study failed to distinguish the task-approach goal from the self-approach goal, and the task-avoidance goal from the self-

avoidance goal, their responses to the interview question revealed that they used task-, self-, or other-based competence either positively or negatively in their justification of achievement goal endorsement, which was clearly evidenced in the emergent themes/subcategories reported earlier. Examples included, "I just always want to do better than I've done before" (self-based competence; self-approach goal), "I don't like being bad compared to other people" (other-based competence; other-avoidance goal), and "My big focus is just getting all the biomechanics and movements right because I want to preserve my body" (task-based competence; task-approach goal).

An examination of the frequencies of the themes/subcategories revealed that students were more likely to focus on self- or task-based competence than other-based competence, adding support to the questionnaire data that the task/self-approach goals had the highest mean score than other three goals. Additionally, a few students considered such factors as being physically active, having fun, and maximizing effort to justify their achievement goal endorsement. This suggests that achievement goal endorsement went above and beyond definition of competence and valence of competence as described in the 3 × 2 model of achievement goals by including more diverse factors.

The fifth interview question attempted to shed some light on how the learning environment might influence student achievement goal endorsement in college PA classes. Instructors and peers are important contextual figures in such settings and what they say and do creates an environment that could lead students to endorse different achievement goals. The two most salient themes, impact of learning environment and influence of self and others, emerged from students' responses to this question seemed to support this view as they revealed that instructors and peers (or friends) were perceived as the most important factors influencing

achievement goal endorsement in the current study. “He [instructor] knows a lot about handball. So, it’s good to have him around and have him watch us,” and “They [friends] also want to be better and so that made me also want to be better at kick boxing,” captured the influence of instructors and peers/friends perceived by this group of students in the study. Additionally, opportunities to practice, repeat skills, and play every day were also identified to influence achievement goal endorsement. Overall, the findings support the research literature that the learning environment can influence student achievement goals (Ames, 1992a; Anderman & Young, 1994; Kaplan & Maehr, 2007; Wigfield & Cambria, 2010).

2.4.1 Implications for Practices and Future Research

As a theoretical perspective for studying student motivation and related cognitive, affective and behavioral outcomes, the 3 × 2 achievement goal model and the 3 × 2 AGQ have both been applied to academic and sport settings. Despite these application, nothing is known about their utilization in college PA settings. Results of this study revealed six achievement goals assessed by the 3 × 2 AGQ failed to emerge as distinct goal constructs as construed in the 3 × 2 model. This group of college students was not able to differentiate among the six achievement goals. Given that this study is the first to examine the 3 × 2 goal model and 3 × 2 AGQ among American college students in a PA setting, we call for additional research to further examine the application of the 3 × 2 achievement goal model and 3 × 2 AGQ in similar settings. Perhaps item response theory (IRT) psychometric analysis (Embretson, 1983, 1998) can be used to determine what wording of the 3 × 2 AGQ items needs to be improved in addition to CFA techniques that examine structural validity.

Similar to findings reported in physical education/PA and sport settings (Markland &

Tobin, 2004; Wilson et al., 2006), the BREQ-3 in the current study demonstrated strong factorial validity and reliability after item 12 "I get restless if I don't participate regularly" was removed. This finding suggests that the BREQ-3 can be used as a reliable and valid measure to assess six motivational regulations among American college-aged students in PA classes. This finding also suggests item 12 is not a good fit and an alternative might be found and tested to improve the BREQ-3.

The four achievement goals assessed by the 3 × 2 AGQ produced reliable and valid scores. Among the four goals, task/self-approach goals were most motivationally beneficial as they positively predicted persistence/effort, enjoyment, and perceived health among this group of participants. Task/self-approach goals also had an indirect effect on MVPA through intrinsic regulation. These findings support achievement goal theory and empirical work that task-approach goals and self-approach goals facilitate student motivation and learning (Elliot et al., 2011; Mascret et al., 2015; Ning, 2016; Wang et al., 2017). Additionally, other-approach goals were found to be a positive predictor of perceived health. In sum, promoting both task/self-approach goals and other-approach goals can be effective in increasing students' engagement, enjoyment, and perceived health in college PA classes. As such, instructors should promote task/self-approach goals by focusing on task mastery, personal improvement, and learning skills and other-approach goals by providing students opportunities to engage in competitive activities in PA classes.

Compared to other motivational regulations, this study found intrinsic regulation played a more consistent and salient role in students' achievement/educational outcomes examined in the current study. This finding provides further empirical support that intrinsic regulation, in accordance with SDT, is assumed to be positively related to outcomes, such as engagement,

academic achievement, and a preference to attempt challenging tasks (Deci, Vallerand, Pelletier, & Ryan, 1991; Standage, Duda, & Ntoumanis, 2005). Therefore, it is important to promote intrinsic regulation in college PA classes. One way to do so is that instructors provide students learning experiences in an interesting and enjoyable way. Another way is that instructors allow students' perspectives and support their sense of choice, which can also result in increased enjoyment and intrinsic motivation in PA classes (Ntoumanis, 2005). Finally, we recommend instructors discuss which activities, games, and movement skills best fit their student's current preferences and physical needs, then provide opportunities for choice and critical thinking.

The interview data revealed that self- or task-based competence was more often referred to as the basis for achievement goal endorsement than other-based competence, providing insightful information about why this group of students recorded higher scores on the task/self-approach goal than the task/self-avoidance goal, other-approach goal, or other avoidance goal. The interview data also showed that students identified instructors and peers (or friends) as the most influential force on their achievement goals in college PA classes. To gain a more complete picture of why students favor certain achievement goals, both qualitative and quantitative approaches are recommended in the future research endeavors. For example, the inclusion of a qualitative approach could allow researchers to understand why students endorse certain achievement goals identified through a quantitative approach.

It is important to note that this study has several limitations. First, this study does not determine causal effects among variables because of the cross-sectional design. Second, this study represents an initial attempt to investigate the psychometric properties of the 3 × 2 AGQ in the context of college PA classes. Results indicated that task-based goals and self-based goals as conceptualized in the 3 × 2 model of achievement goals were not empirically distinguishable

among this group of participants. Therefore, additional research is needed to confirm or refute this finding. Third, this study extended previous research work by assessing students' MVPA via accelerometers. However, due to a limited number of accelerometers available for the current study, only 224 out of 556 participants wore accelerometers to provide data on MVPA. Additionally, no MVPA data were collected in yoga and swimming classes because accelerometers cannot easily measure movement in these environments. More seriously, accelerometer data were collected in PA classes with varying levels of physical activity. For example, students in basketball classes had more physical activity engagement than students in judo classes. Despite differing physical activity levels inherent in those classes, the data were analyzed aggregately. Considered together, relationships among achievement goals, motivational regulations, and MVPA examined in the current study might have been impacted as a result. Therefore, readers should interpret them with caution. Finally, the primary limitation of the study is the lack of generalizability. Given the complex nature of today's research, variables explored, etc., there should be no attempt to generalize beyond the immediate population. Future research should target multiple universities to improve generalizability. Despite these limitations, results of this study add to the knowledge base of college students' motivation for physical activity participation by documenting that task/self-approach goals, other-approach goals, and intrinsic regulation all contributed to college students' persistence/effort, enjoyment, perceived health, and MVPA in PA classes.

CHAPTER III

CONCLUSION

The four research questions were proposed in the current study in an attempt to understand students' motivation and related achievement/educational outcomes in college PA classes from different angles. The first research question examined whether the 3 × 2 AGQ and BREQ-3 could reliably and validly assess students' achievement goals and motivational regulations, respectively, in college PA classes. The second research question investigated significant relationships among achievement goals, motivational regulations, and students' achievement/educational outcomes (i.e., persistence/effort, enjoyment, perceived health, and physical activity). The third research question assessed the mediating role of motivational regulations in the relationships between achievement goals and students' achievement/educational outcomes. Accordingly, questionnaire data and accelerometer data were collected and analyzed. The fourth research question explored experiences/factors that participating students perceived that contributed to their endorsement of different achievement goals in PA classes. To answer this question, semi-structured interviews were conducted with select students and content analysis was employed to analyze the interview data. The importance of this study is summarized below.

3.1 Research Findings and Results

First, this study represents an initial effort to examine the psychometric properties of the 3 × 2 AGQ and BREQ-3 among American college students in PA classes. The 3 × 2 AGQ failed to assess the six achievement goals (task-approach goals, self-approach goals, other-approach

goals, task-avoidance goals, self-avoidance goals, and other-avoidance goals) as conceptualized in the 3 × 2 model of achievement goals (Elliot et al., 2011), suggesting that these achievement goals were not distinguishable among this group of students in a college PA setting. Instead, the 3 × 2 AGQ served as a reliable and valid measure assessing four achievement goals in the current study: task/self-approach, task/self-avoidance, other-approach, and other-avoidance. The BREQ-3, on the other hand, demonstrated acceptable reliability and validity after the removal of the item, "I get restless if I don't participate regularly." This finding indicates that BREQ-3 can reliably and validly assess six motivational regulations (intrinsic regulation, integrated regulation, identified regulation, introjected regulation, external regulation, and amotivation) as theorized in SDT in American College PA classes.

Second, this study examined relationships among achievement goals, motivational regulations, and students' achievement/educational outcomes. The most significant findings are as follows: task/self-approach goals positively predicted enjoyment, persistence/effort, and perceived health; intrinsic regulation positively predicted enjoyment and MVPA; integrated regulation positively predicted perceived health; and identified regulation positively predicted persistence/effort. These findings support both theoretical and empirical work that task/self-approach goals and more self-determined motivation are important for students to accomplish positive achievement/educational outcomes across academic, sport, PA and physical education settings (Black & Deci, 2000; Boiché et al., 2008; Elliot et al., 2011; Gao et al., 2012; Li, 1999; Mascret et al., 2015; Ning, 2016; Wang et al., 2017).

Third, this study extends previous research by showing more self-determined motivation (i.e., intrinsic regulation, integrated regulation, and identified regulation) mediated the relationships between achievement goals and achievement/educational outcomes, partially or

fully, in the context of American college PA. These mediating effects indicate more self-determined motivation would play a significant role in enhancing student's engagement, performance and achievement in PA classes.

Last, this study explored experiences/factors that students perceived to have contributed to their endorsement of achievement goals in their PA classes from a qualitative perspective. The interview data revealed students justified their achievement goal endorsement primarily based on task-, self-, and other-based competence described in the 3 × 2 model of achievement goals. Students also identified instructors and peers (or friends) as major contributors to their endorsement of different achievement goals in their PA classes. Given this finding, instructors are encouraged to figure out how to use their influence as well as the influence of peers to help students endorse achievement goals that are motivationally beneficial, such as task/self-approach goals, in college PA classes.

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APPENDIX A

THE TASK AND EGO ORIENTATION IN SPORT QUESTIONNAIRE (TEOSQ)

1	2	3	4	5
Strongly disagree	*Disagree*	*Neutral*	*Agree*	*Strongly agree*

I feel most successful in sport when…

Task orientation

I learn a new skill and it makes me want to practice more.

I work really hard.

I do my very best.

Something I learn makes me want to go practice more.

A skill I learn really feels right.

I learn something that is fun to do.

Ego orientation

The others cannot do as well as me

I am the best.

Others mess up but I do not.

I can do better than my friends.

I score the most points/goals/hits, etc.

I am the only one who can do the play or skill.

APPENDIX B

THE PERCEPTION OF SUCCESS QUESTIONNAIRE (POSQ)

A	B	C	D	E
Strongly agree	*Agree*	*Neutral*	*Disagree*	*Strongly disagree*

When playing sport, I feel most successful when…

Task orientation

I reach personal goals.

I show clear personal improvement.

I perform to the best of my ability.

I overcome difficulties.

I reach a goal.

I work hard.

Ego orientation

I show other people I am best.

I am the best.

I am clearly superior.

I outperform my opponents.

I beat other people.

I win.

APPENDIX C

THE TRICHOTOMOUS ACHIEVEMENT GOAL SCALE (TAGS)

1	2	3	4	5	6	7
Not at all true of me	*Rarely true of me*	*Somewhat true of me*	*Neutral*	*Reasonably true me*	*True of me*	*Very true of me*

Mastery goal

I want to learn as much as possible from this class.

It is important for me to understand the content of this course as thoroughly as possible.

I hope to have gained a broader and deeper knowledge of psychology when I am done with this class.

I desire to completely master the material presented in this class.

In a class like this, I prefer course material that arouses my curiosity, even if it is difficult to learn.

In a class like this, I prefer course material that really challenges me so I can learn new things.

Performance-approach goal

It is important to me to do better than the other students.

My goal in this class is to get a better grade than most of the students.

I am striving to demonstrate my ability relative to others in this class.

I am motivated by the thought of outperforming my peers in this class.

It is important to me to do well compared to others in this class.

I want to do well in this class to show my ability to my family, friends, advisors, or others.

Performance-avoidance goal

I often think so myself, “what if I do badly in this class?”

I worry about the possibility of getting a bad grade in this class.

My fear of performing poorly in this class is often what motivates me.

I just want to avoid doing poorly in this class.

I'm afraid that if I ask my TA or instructor a "dumb" question, they might not think I'm very smart.

I wish this class was not graded.

APPENDIX D

THE 2 × 2 ACHIEVEMENT GOAL QUESTIONNAIRE (AGQ)

1	2	3	4	5	6	7
Not at all true of me	*Rarely true of me*	*Somewhat true of me*	*Neutral*	*Reasonably true me*	*True of me*	*Very true of me*

Mastery-approach

I want to learn as much as possible from this class.

It is important for me to understand the content of this course as thoroughly as possible.

I desire to completely master the material presented in this class.

Mastery-avoidance

I worry that I may not learn all that I possibly could in this class.

Sometimes I'm afraid that I may not understand the content of this class as thoroughly as I'd like.

I am often concerned that I may not learn all that there is to learn in this class.

Performance-approach

It is important for me to do better than other students.

It is important for me to do well compared to others in this class.

My goal in this class is to get a better grade than most of the other students.

Performance-avoidance

I just want to avoid doing poorly in this class.

My goal in this class is to avoid performing poorly.

My fear of performing poorly in this class is often what motivates me.

APPENDIX E

THE ACHIEVEMENT GOAL QUESTIONNAIRE-REVISED (AGQ-R)

1	2	3	4	5
Strongly disagree	*Disagree*	*Neutral*	*Agree*	*Strongly agree*

Mastery-approach

My goal is to learn as much as possible.

I am striving to understand the content of this course as thoroughly as possible.

My aim is to completely master the material presented in this class.

Mastery-avoidance

My aim is to avoid learning less than I possibly could.

I am striving to avoid an incomplete understanding of the course material.

My goal is to avoid learning less than it is possible to learn

Performance approach

My goal is to perform better than the other students.

I am striving to do well compared to other students.

My aim is to perform well relative to other students.

Performance-avoidance

My aim is to avoid doing worse than other students.

My goal is to avoid performing poorly compared to others.

I am striving to avoid performing worse than others.

APPENDIX F

THE 3 × 2 ACHIEVEMENT GOAL QUESTIONNAIRE (3 × 2 AGQ)

1	2	3	4	5	6	7
Not at all true of me	*Rarely true of me*	*Somewhat true of me*	*Moderately true of me*	*Reasonably true of me*	*Very true of me*	*Extremely true of me*

Task-approach

To get a lot of questions right on the exams in this class

To know the right answers to the questions on the exams in this class

To answer a lot of questions correctly on the exams in this class

Task-avoidance

To avoid incorrect answers on the exams in this class

To avoid getting a lot of questions wrong on the exams in this class

To avoid missing a lot of questions on the exams in this class

Self-approach

To perform better on the exams in this class than I have done in the past on these types of exams

To do well on the exams in this class relative to how well I have done in the past on such exams

To do better on the exams in this class than I typically do in this type of situation

Self-avoidance

To avoid doing worse on the exams in this class than I normally do on these types of exams

To avoid performing poorly on the exams in this class compared to my typical level of performance

To avoid doing worse on the exams in this class than I have done on prior exams of this type

Other-approach

To outperform other students on the exams in this class

To do well compared to others in the class on the exams

To do better than my classmates on the exams in this class

Other-avoidance

To avoid doing worse than other students on the exams in this class

To avoid doing poorly in comparison to others on the exams in this class

To avoid performing poorly relative to my fellow students on the exams in this class

APPENDIX G

THE 3 × 2 ACHIEVEMENT GOAL QUESTIONNAIRE-SPORT (3 × 2 AGQ-S)

1	2	3	4	5	6	7
Strongly disagree	*Disagree*	*Somewhat disagree*	*Neither agree or disagree*	*Somewhat agree*	*Agree*	*Strongly agree*

In sport, my goal is…

Task-approach

To perform well

To obtain good results

To be effective

Task-avoidance

To avoid performing badly

To avoid bad results

To avoid being ineffective

Self-approach

To do better than what I usually do

To have better results than I had in the past

To be more effective than before

Self-avoidance

To avoid having worse results than I had previously

To avoid doing worse than I usually do

To avoid being less effective compared to my usual level of performance

Other-approach

To do better than others

To be more effective than others

To have better results than others

Other-avoidance

To avoid doing worse than others

To avoid worse results than others

To avoid being less effective than others

APPENDIX H

CONSENT FORM

TEXAS A&M UNIVERSITY HUMAN SUBJECTS PROTECTION PROGRAM

CONSENT FORM

Project Title: The 3 × 2 Achievement Goal Model and Motivational Regulation in College Physical activity classes

You are invited to take part in a research study being conducted by Jihye Lee, a doctoral student from the Sport Pedagogy Program in the Health and Kinesiology Department at Texas A&M University. You are being asked to read this form so that you know about this research study. The information in this form is provided to help you decide whether or not to take part. If you decide to take part in the study, you will be asked to sign this consent form. If you decide you do not want to participate, there will be no penalty to you, and you will not lose any benefits you normally would have.

Why Is This Study Being Done?
The purpose of this study is to examine relationships among the 3 × 2 achievement goal model, motivational regulations, and outcomes in college physical activity classes.

Why Am I Being Asked To Be In This Study?
You are being asked to be in this study because you are enrolled in a physical activity class in the fall of 2016. You are recruited to provide assessment of participating students' achievement goals, motivational regulations, and outcomes in college physical activity classes.

How Many People Will Be Asked To Be In This Study?
Approximately 1000 participants will be invited to participate in this study locally. Participants consist of students enrolled in diverse physical activity classes at Texas A&M University.

What Are the Alternatives to being in this study?
There are none; the alternative to being in the study is not to participate.

What Will I Be Asked To Do In This Study?
Your participation will involve completing a questionnaire that consists of four parts. The first part is a biographical sheet that seeks information concerning your age, gender, university classification, type of physical activity class enrolled, and university GPA. The second part is an achievement goals survey that includes 18 questions. The third part is a motivational regulations questionnaire of 24 questions. The last part includes 28 questions assessing motivational outcomes (e.g., persistence/effort, perceived health/physical activity level). The questionnaire will take about 20 minutes to complete. Approximately two weeks after completing the questionnaire, you will wear an accelerometer for three consecutive classes, if you are chosen to

do so. This will provide a measure of your in-class physical activity. You will also have a chance to be selected for an individual interview that will last for about 20 minutes. If you agree to be interviewed, you will be asked to answer questions related to achievement goal adoption in your physical activity class. Finally, your grade in the physical activity class will be acquired from your instructor.

_____ I want to participate in completing the questionnaire and wearing the accelerometer in this research study.

_____ I want to participate in completing the questionnaire, wearing the accelerometer, and to be interviewed in this research study.

_____ I want to participate in completing the questionnaire and wearing the accelerometer, but I don't want to be interviewed in this research study.

Will Photos, Video or Audio Recordings Be Made Of Me during the Study?
The researchers will make an audio recording during the interview so that the interview data can be transcribed verbatim. Only if you agree to be audiotaped can you participate in the interview.

_____ I give my permission for audio recording to be made of me during my participation in this research study.

_____ I do not give my permission for audio recording to be made of me during my participation in this research study.

Are There Any Risks To Me?
The things that you will be doing have no physical, mental, or social risks ordinarily encountered in daily life. Your decision on whether to participate or not will not benefit or harm your performance in class.

Are There Any Benefits To Me?
There are no direct benefits; however, the information researchers gather may be of benefit to education in understanding student motivation and related cognitive, affective, and behavioral outcomes in physical activity classes. It also provides additional information about perceived experiences that contribute to students' adoption of different achievement goals in physical activity classes.

Will There Be Any Costs To Me?
Aside from your time, there are no costs for taking part in the study.

Will I Be Paid To Be In This Study?
You will not be paid for being in this study

Will Information From This Study Be Kept Private?

The records of this study will be kept private. No identifiers linking you to this study will be included in any sort of report that might be published. Research records will be stored securely and only the involved researchers will have access to the records.

Information about you will be stored in a locked file cabinet and a computer file protected with a password. This consent form will be filed securely in an official area.

People who will have access to your information include the Principal Investigator and research study personnel. Representatives of regulatory agencies such as the Office of Human Research Protections (OHRP) and entities such as the Texas A&M University Human Subjects Protection Program may access your records to make sure the study is being run correctly and that information is collected properly.

Who may I Contact for More Information?
You may contact Jihye Lee, to tell her about a concern or complaint about this research at 979-436-5156 or vkstm49@hlkn.tamu.edu.

For questions about your rights as a research participant, to provide input regarding research, or if you have questions, complaints, or concerns about the research, you may call the Texas A&M University Human Subjects Protection Program office by phone at 1-979-458-4067 or by email at irb@tamu.edu.

What if I Change My Mind About Participating?
This research is voluntary and you have the choice whether or not to be in this research study. You may decide to not begin or to stop participating at any time. If you choose not to be in this study or stop being in the study, there will be no effect on your student status, medical care, employment, evaluation, relationship with Texas A&M University, etc.

STATEMENT OF CONSENT
I agree to be in this study and know that I am not giving up any legal rights by signing this form. The procedures, risks, and benefits have been explained to me, and my questions have been answered. I know that new information about this research study will be provided to me as it becomes available and that the researcher will tell me if I must be removed from the study. I can ask more questions if I want. A copy of this entire consent form will be given to me.

_____ _____
Participant's Signature Date

_____ _____
Printed Name Date

INVESTIGATOR'S AFFIDAVIT:
Either I have or my agent has carefully explained to the participant the nature of the above project. I hereby certify that to the best of my knowledge the person who signed this consent form was informed of the nature, demands, benefits, and risks involved in his/her participation.

_____	_____
Signature of Presenter	Date
_____	_____
Printed Name	Date

APPENDIX I

BIOGRAPHICAL DATA QUESTIONNAIRE

Please print your name: _____

Please specify your date of birth: _____(Month)_____(Day)_____(Year); Your age_____

Please specify your gender: (1) Male ____ (2) Female ____

You consider yourself to be:

(1) Caucasian-American _____ (2) Hispanic-American _____

(3) African-American _____ (4) Asian-American _____ (5) Other _____

Please specify your college: _____ and Major: _____

Please specify your classification:

(1) Freshman _____ (2) Sophomore _____ (3) Junior _____ (4) Senior _____

(5) Other (please specify) _____

What physical activity class are you taking where you are completing this survey (e.g. aerobic running, archery, and yoga etc.)? _____

If this physical activity class is elective for you, please write down at least one sentence why you are taking it below.

_____

What grade do you expect to receive for this class? (e.g., 90 out of 100) _____

Did you moderately or vigorously exercise 5 days last week? Yes or No

If you agree to be interviewed individually, please write down your phone number, e-mail address and available time below. Thanks.

Phone number: _____ Email: _____

Available time: _____, Mon Tue Wed Thurs Fri

APPENDIX J

ACHIEVEMENT GOAL QUESTIONNAIRE-PHYSICAL ACTIVTY CLASS

Direction: The following statements represent types of goals that you may or may not have in your physical activity class. **Circle a number to indicate how true each statement is of you.** All of your responses will be kept anonymous and confidential. There is no right or wrong response, so please be open and honest.

If you think the statement is very true of you, circle 7; if a statement is not at all true of you, circle 1. If the statement is more or less true of you, find the number between 1 and 7 that best describes you.

1	2	3	4	5	6	7
Not at all true of me	*Rarely true of me*	*Somewhat true of me*	*Moderately true of me*	*Reasonably true of me*	*Very true of me*	*Extremely true of me*

In this physical activity class, my goal is…

	Not at all true → Extremely true of me						
a. to get a lot of physical activities/movements right.	1	2	3	4	5	6	7
b. to perform better than I had done in the past.	1	2	3	4	5	6	7
c. to outperform others.	1	2	3	4	5	6	7
d. to avoid doing physical activities/movements wrong.	1	2	3	4	5	6	7
e. to avoid doing worse than I had done in the past.	1	2	3	4	5	6	7
f. to avoid performing worse than others.	1	2	3	4	5	6	7
g. to do physical activities/movements right.	1	2	3	4	5	6	7
h. to do well relative to how well I had done in the past.	1	2	3	4	5	6	7
i. to do well compared to others.	1	2	3	4	5	6	7

1	2	3	4	5	6	7
Not at all true of me	*Rarely true of me*	*Somewhat true of me*	*Moderately true of me*	*Reasonably true of me*	*Very true of me*	*Extremely true of me*

In this physical activity class, my goal is…

	Not at all true → Extremely true of me						
j. to avoid getting a lot of physical activities/movements wrong.	1	2	3	4	5	6	7
k. to avoid performance decline.	1	2	3	4	5	6	7
l. to avoid doing poorly in comparison to others.	1	2	3	4	5	6	7
m. to do a lot of physical activities/movements correctly.	1	2	3	4	5	6	7
n. to improve myself in physical activities/movements.	1	2	3	4	5	6	7
o. to do better than others.	1	2	3	4	5	6	7
p. to avoid missing opportunities to learn what is taught.	1	2	3	4	5	6	7
q. to avoid doing worse than I had done previously in this class.	1	2	3	4	5	6	7
r. to avoid performing poorly relative to my fellow students.	1	2	3	4	5	6	7

APPENDIX K

COLLEGE STUDENTS' PHYSICAL ACTIVITY CLASS REGULATIONS

QUESTIONNAIRE

Direction: The following statements represent the reasons underlying peoples' decisions to engage or not engage in physical activity class. **Circle a number to indicate how true each statement is of you.** All of your responses will be kept anonymous and confidential. There is no right or wrong response, so please be open and honest.

1	2	3	4	5	6	7
Not at all true of me	*Rarely true of me*	*Somewhat true of me*	*Moderately true of me*	*Reasonably true of me*	*Very true of me*	*Extremely true of me*

WHY DO YOU PARTICIPATE IN THIS PHYSICAL ACTIVITY CLASS?

	Not at all true → Extremely true of me						
a. It's important to me to participate.	1	2	3	4	5	6	7
b. I don't see why I should have to participate.	1	2	3	4	5	6	7
c. I participate because it's fun.	1	2	3	4	5	6	7
d. I feel guilty when I don't participate.	1	2	3	4	5	6	7
e. I participate because it is consistent with my life goals.	1	2	3	4	5	6	7
f. I participate because other people say I should.	1	2	3	4	5	6	7
g. I value the benefits of regular participation in physical activity.	1	2	3	4	5	6	7
h. I can't see why I should bother participating.	1	2	3	4	5	6	7
i. I enjoy my activities.	1	2	3	4	5	6	7
j. I feel ashamed when I miss any day of the class.	1	2	3	4	5	6	7
k. I consider regular participation in physical activity part of my identity.	1	2	3	4	5	6	7

1	2	3	4	5	6	7
Not at all true of me	*Rarely true of me*	*Somewhat true of me*	*Moderately true of me*	*Reasonably true of me*	*Very true of me*	*Extremely true of me*

WHY DO YOU PARTICIPATE IN THIS PHYSICAL ACTIVITY CLASS?

	Not at all true → Extremely true of me						
l. I participate because my friends/family/partner say I should.	1	2	3	4	5	6	7
m. I think it is important to make the effort to participate regularly.	1	2	3	4	5	6	7
n. I don't see the point in participating.	1	2	3	4	5	6	7
o. I find participation pleasurable activity.	1	2	3	4	5	6	7
p. I feel like a failure when I haven't participated in a while.	1	2	3	4	5	6	7
q. I consider regular participation in physical activity a fundamental part of who I am.	1	2	3	4	5	6	7
r. I participate because others will not be pleased with me if I don't.	1	2	3	4	5	6	7
s. I get restless if I don't participate regularly.	1	2	3	4	5	6	7
t. I think regular participation in physical activity is a waste of time.	1	2	3	4	5	6	7
u. I get pleasure and satisfaction from my participation.	1	2	3	4	5	6	7
v. I would feel bad about myself if I was not making effort to participate.	1	2	3	4	5	6	7
w. I consider regular participation in physical activity consistent with my values.	1	2	3	4	5	6	7
x. I feel under pressure from my friends/family to participate in this class.	1	2	3	4	5	6	7

APPENDIX L

PERCEPTIONS ABOUT PHYSICAL ACTIVTY CLASS

Direction: Please answer each question truthfully. **Circle one number only for each statement. There is no right or wrong answer.** So please be open and honest.

1	2	3	4	5	6	7
Not at all true of me	*Rarely true of me*	*Somewhat true of me*	*Moderately true of me*	*Reasonably true of me*	*Very true of me*	*Extremely true of me*

1. In this physical activity class…

	Not at all true → Extremely true of me						
a. I work hard to do well even if I do not like something we are doing.	1	2	3	4	5	6	7
b. I spend extra time and effort trying to do well.	1	2	3	4	5	6	7
c. I overcome difficulties to participate regularly.	1	2	3	4	5	6	7
d. I push myself as far as possible when I am already physically tired.	1	2	3	4	5	6	7

2. Please circle a number to indicate how true each statement below is of you.

1	2	3	4	5	6	7
Not at all true of me	*Rarely true of me*	*Somewhat true of me*	*Moderately true of me*	*Reasonably true of me*	*Very true of me*	*Extremely true of me*

	Not at all true → Extremely true of me						
a. I enjoy this physical activity class.	1	2	3	4	5	6	7
b. I find this physical activity class pleasurable.	1	2	3	4	5	6	7
c. This physical activity class gives me a strong feeling of success.	1	2	3	4	5	6	7
d. I have a lot of fun in this physical activity class.	1	2	3	4	5	6	7

3. Please circle one number only for each statement below.

1	*2*	*3*	*4*	*5*	*6*	*7*
Extremely poor	*Very poor*	*poor*	*Somewhat good*	*Good*	*Very good*	*Extremely good*

Extremely poor → Extremely good

a. How would you rate your own health at present?	1	2	3	4	5	6	7
b. What do you think of your own health condition compared to that of other men/women of your age?	1	2	3	4	5	6	7

Thank you for taking part in our research!

APPENDIX M

INTERVIEW PROTOCOL

Howdy!

I am _____, today I am talking with _____. I would like to know your experiences in this physical activity class that may influence what achievement goal you adopt in the class.

Achievement goals

1. Why do you want to take this class?

2. What is your goal for this class?

3. Please tell me, what helped you do well in this class?

4. When you completed the questionnaire a few weeks ago, you indicated that you strongly agreed/disagreed with statements that measured task/self-approach goals, other-approach goals, task/self-avoidance goals, or other-avoidance goals. Would you please tell me why you strongly agreed/disagreed with these statements?

5. Was there anything in this physical activity class that made you want to strongly agree/disagree with these statements?

Thank you very much for your thoughtful responses! In addition to these questions, is there anything you would like to add or elaborate?

Thank you for participating in this interview!