REIFSTECK, ERIN J., Ph.D. A Modeling Approach to Identity, Motivation, and Physical Activity Participation in Former College Athletes. (2014)
Directed by Dr. Diane L. Gill. 115 pp.

Research indicates that many athletes fail to maintain regular physical activity participation after transitioning out of competitive sports. Despite the important health consequences for athletes who drop from high activity to inactivity after completing their athletic careers, long-term physical activity maintenance among former college athletes is understudied. The present study examined physical activity behavior in former college athletes. Previous research suggests that self-identity influences physical activity participation, and individuals who are motivated by self-determined and volitional reasons are more likely to maintain their exercise behavior over time. Therefore, this research examined a theoretical model that incorporates tenets of identity theory and self-determination theory to investigate the relationships among identity, motivation, and physical activity participation in former college athletes.

A total of 282 former Division I college athletes completed an online survey consisting of the Exercise Identity Scale, the Athletic Identity Measurement Scale, the Behavioral Regulation for Exercise Questionnaire, the Godin Leisure Time Exercise Questionnaire, and demographic items. Results suggest that exercise identity and athletic identity are both positively related to physical activity in former college athletes, and the identity - physical activity relationship was only partially mediated by self-determined forms of motivation. Exercise identity was a stronger predictor of self-determined motivation and physical activity compared to athletic identity. There was a significant interaction effect between exercise identity and athletic identity such that having a higher

exercise identity strengthened the athletic identity - physical activity relationship. Path analyses are presented that model the direct and indirect effects among the identity, motivation, and physical activity variables. The relevant implications of these models for former college athletes and their participation in physical activity are discussed. The findings of this study add to our understanding of former college athletes' physical activity behavior within an identity and self-determination theory framework, and provide an evidence base to guide the development of appropriate interventions that can promote healthy, active lifestyles among current and future student-athletes.

A MODELING APPROACH TO IDENTITY, MOTIVATION, AND PHYSICAL ACTIVITY PARTICIPATION IN FORMER COLLEGE ATHLETES

by

Erin J. Reifsteck

A Dissertation Submitted to
the Faculty of the Graduate School at
The University of North Carolina at Greensboro
in Partial Fulfillment
of the Requirements for the Degree
Doctor of Philosophy

Greensboro
2014

Approved by

_____
Committee Chair

To all of the mentors in my life who helped me get here and inspire me to keep going.

APPROVAL PAGE

This dissertation written by Erin J. Reifsteck has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

Committee Chair _____
Diane Gill

Committee Members _____
Paul Davis

_____
Lavon Williams

_____
John Willse

_____March 19, 2014_____
Date of Acceptance by Committee

_____March 19, 2014_____
Date of Final Oral Examination

ACKNOWLEDGEMENTS

I would like to thank Dr. Diane Gill for advising me throughout my graduate studies at The University of North Carolina at Greensboro. I am very grateful for her exceptional mentorship. I would also like to thank my committee members, Dr. Paul Davis, Dr. Lavon Williams, and Dr. John Willse, for their advisement and contribution to this project. I want to acknowledge the Kinesiology Department and the School of Health and Human Sciences at UNCG for providing me with research support and opportunities to develop my scholarship. Additionally, I would like to thank my colleagues in the Sport and Exercise Psychology Program who create a challenging and supportive environment that promotes a quality and productive experience for graduate students. Finally, I would like to thank Matthew Shilling and my entire family; their continued support makes everything I do possible.

TABLE OF CONTENTS

Page

LIST OF TABLES vi

LIST OF FIGURES vii

CHAPTER

I. INTRODUCTION 1

II. REVIEW OF THE LITERATURE 10

III. METHODS 36

IV. RESULTS 49

V. DISCUSSION 67

REFERENCES 79

APPENDIX A. MEASURES 90

APPENDIX B. PARTICIPANT CONSENT FORM 97

APPENDIX C. ADDITIONAL FIGURES 100

LIST OF TABLES

Page

Table 1. Motivational Barriers for Physical Activity in Former College Athletes 34

Table 2. Scale Descriptives in Current Sample 39

Table 3. Disattenuated Correlations for Motivation Subscales 40

Table 4. Sport Classification 50

Table 5. Activity Level Classification 52

Table 6. Observed Correlations and Standard Deviations 56

Table 7. Maximum Likelihood Parameter Estimates for Motivation Type Predicting Physical Activity 57

Table 8. Maximum Likelihood Parameter Estimates for Exercise Identity, Motivation, and Physical Activity Model 60

Table 9. Variance Explained by the Exercise Identity, Motivation, and Physical Activity Model 61

Table 10. Maximum Likelihood Parameter Estimates for Athletic Identity, Motivation, and Physical Activity Model 63

Table 11. Maximum Likelihood Parameter Estimates for the Combined Effects of Exercise Identity and Athletic Identity in Predicting Physical Activity 65

LIST OF FIGURES

Page

Figure 1. Conceptual Model for Exercise Identity, Self-Determined Motivation, and Physical Activity 7

Figure 2. Conceptual Model for Athletic Identity, Self-Determined Motivation, and Physical Activity 8

Figure 3. Conceptual Model for Combined Effect of Athletic Identity and Exercise Identity in Predicting Self-Determined Motivation and Physical Activity 9

Figure 4. SDT Motivation Continuum 23

Figure 5. Hypothesized Relationships for Research Question 1 46

Figure 6. Hypothesized Relationships for Research Question 2 47

Figure 7. Hypothesized Relationships for Research Question 3 48

Figure 8. Exercise Identity, Motivation, and Physical Activity Standardized Path Diagram 59

Figure 9. Athletic Identity, Motivation, and Physical Activity Standardized Path Diagram 62

Figure 10. Combined Exercise Identity, Athletic Identity, and Physical Activity Standardized Path Diagram 66

Figure 11. Conceptual Model of a Physical Activity Transition Program for College Athletes 75

Figure 12. Preliminary Confirmatory Factoral Analysis for the AIMS 100

Figure 13. Preliminary Confirmatory Factor Analysis for the EIS 101

Figure 14. Preliminary Confirmatory Factor Analysis for the BREQ-2 Plus Integrated Subscale 102

Figure 15. Motivation and Physical Activity Model 103

Figure 16. Original Exercise Identity, Motivation, and Physical Activity Model 104

Figure 17. Original Athletic Identity, Motivation, and Physical Activity Model.....104

Figure 18. Athletic Identity, Motivation, Physical Activity Model Allowing Introjected, Identified, Integrated, and Intrinsic to Covary 105

CHAPTER I

INTRODUCTION

Recently there has been increased public attention on long-term health issues among former athletes. One relevant but under-studied issue is student-athletes' maintenance of healthy lifestyle behaviors after they leave the playing fields and classrooms of their collegiate institutions. Research suggests that some athletes become sedentary after they complete their competitive athletic careers (Reifsteck, Gill, & Brooks, 2013; Stephan, Bilard, Ninot, & Delignieres, 2003a; Stephan et al., 2003b). This is troubling because former athletes who drop from high activity to inactivity are at increased risk for developing cardiovascular and metabolic diseases (Witkowski & Spangenburg, 2008). Given the potential long-term health concerns, research is needed to understand the related factors and develop strategies to help student-athletes maintain physical activity after their college years.

Several theoretical models and considerable research have addressed physical activity behavior in the general population. According to *identity theory*, individuals monitor their behavior based on whether or not it validates their respective identities (Burke, Owens, Serp, & Thoits, 2003; Burke & Reitzes, 1991; Burke & Reitzes, 1981). Research on identity and exercise behavior has demonstrated a clear relationship between various physical activity-related identities (e.g., athletic, exercise, physical activity, sport-

specific) and greater participation in sport, exercise, and physical activity (Brewer, Van Raalte, & Linder, 1993; Estabrooks & Courneya, 1997; Kendzierski, 1988, 1990; Kendzierski, Furr, & Schiavoni,1998; Kendzierski, & Morganstein, 2009; Reifsteck, Gill, & Brooks, 2013, Strachan, Woodgate, Brawley, & Tse, 2005; Yin & Boyd, 2000). Anderson and colleagues (1994; 2001) found a positive relationship between exercise identity and exercise participation and argued for including exercise identity in research on exercise behavior. When exercise identity becomes a valued component of an individual's self-concept, it plays an important role in directing exercise behavior. Thus, fostering exercise identity can promote sustained physical activity participation.

Researchers have started to look at exercise identity within a motivational framework. *Self-determination theory* (SDT) is a logically compatible framework because it specifically includes an identity component. Since Deci and Ryan (1985) introduced SDT, it has been used extensively, and specifically applied to health and exercise behaviors (Ryan, Williams, & Deci, 2009). Ryan and Deci (2000) posit that motivation is multidimensional and complex. They propose that people do not just differ in their amount of motivation but also in the quality or type of motivation. Ryan and Deci distinguish between two main types of motivation: intrinsic and extrinsic. People are intrinsically motivated to participate in behaviors that are inherently interesting and enjoyable.

With extrinsic motivation, people engage in a behavior because it leads to an outcome other than the behavior itself. These extrinsic reasons vary along a continuum from totally external to self-determined and volitional. Amotivation is at the lowest end

of the motivation continuum, when individuals are not at all motivated to engage in a behavior. The next level, external regulation, refers to being motivated entirely by external rewards or punishments. When such external factors disappear, an individual is not likely to maintain the behavior because the reasons for participating were not internalized. Introjected regulation applies to an individual who engages in a behavior to avoid guilt or to enhance self-worth. Identified regulation moves toward more internalized and self-determined motivation and occurs when an individual values the behavior as important to the self. Integrated regulation is the most autonomous and self-determined form of extrinsic motivation and is achieved when the behavior becomes integrated with the person's sense of self. Considerable research supports the tenets of behavioral regulation in SDT and the importance of self-determined motivation in exercise contexts (e.g., Edmunds, Ntoumani, & Duda , 2006; Markland & Tobin, 2004; McLachlan, Spray, & Hagger, 2011; Thorgersen-Ntoumani & Ntroumanis, 2006; Winninger, 2007).

Because SDT posits that people are more likely to maintain a behavior that has been integrated with their self-identity (i.e., exercise because it is part of who you are), it is logical to examine exercise identity and exercise behavior within the SDT framework. Seeing oneself as an exerciser is related to a greater capacity for self-regulation of exercise, which is further enhanced when the person engages in an activity that is motivated by identified reasons (Strachan, Fortier, Perras, & Lugg, 2012). Research shows that self-determined forms of motivation are positively related to exercise identity (Vlachopoulos, Kaperoni, & Moustaka, 2011). Springer, Lamborn, and Pollard (2013)

found that being physically active was central to exercise program participants' identity. Furthermore, participants' continued exercise behavior led to the incorporation of exercise as a defining element of their self-identity, which served as a motivator for continuing to be active. Thus, the initial research on exercise identity within the SDT framework provides support for the marriage of these two theories.

Though research is growing, research has not connected identity and SDT with current and former athletes. Research shows that athletes have higher athletic identity than non-athletes (Brewer Van Raalte, & Linder, 1993; Reifsteck, Gill, & Brooks, 2013); however, athletic identity tends to decrease after retirement from competitive sport (Houle, Brewer, & Kluck, 2010). As athletic identity becomes less salient, former athletes may become less active in sport and less active overall. Indeed, Reifsteck, Gill, and Brooks (2013) found that former college athletes were no more likely to be physically active than non-athletes, and close to a third were sedentary within the past six months. It must be noted that athletic identity and exercise identity are not equivalent constructs. Research on exercise identity has consistently shown a very strong relationship with exercise behavior; however, whether current athletes have an exercise identity, or whether athletes transition from an "athlete" identity to an "exerciser" identity is not clear. It is likely that former athletes who do not identify as strongly with either athletics or exercise do not maintain their activity level after transitioning out of competitive sports.

Research suggests that competitive athletes tend to be more extrinsically focused than recreational athletes (Ryan, Williams, & Deci, 2009). Furthermore, SDT posits that

extrinsic rewards can serve to undermine intrinsic motivation, which may be an important issue for college athletes who are often motivated by scholarships, coaches, teammates, trainers, and fans. When these external motivators disappear after college, their motivation to be active may also dissipate. However, those individuals who maintain their active identities may continue to be active. As the research shows, many former athletes struggle with maintaining their activity after their sport career, and some argue that a "detraining program" might prevent an abrupt change in physical activity that could threaten a transitioning athlete's identity and self-worth (Stephan, Bilard, Ninot, & Delignieres, 2003a; Stephan et al., 2003b).

Purpose

Given that maintaining healthy physical activity after college is an important issue for athletes and their health, the purpose of this study was to examine physical activity participation among former college athletes using an identity and self-determined motivation framework. Specifically, the independent and combined effects of exercise identity and athletic identity in predicting self-determined motivation for physical activity and participation in physical activity were examined. First, a model of exercise identity, self-determined motivation, and physical activity participation based on previous findings with the general population was tested with a sample of former athletes. Then, a similar model was examined for athletic identity, self-determined motivation, and physical activity. Finally, athletic identity and exercise identity were incorporated into a single model to determine their combined influence on physical activity. The three main research questions and corresponding hypotheses in this study are outlined below:

Research Question 1: Does exercise identity predict self-determined motivation and physical activity participation in former college athletes?

Hypothesis 1: Exercise identity positively predicts physical activity participation. Higher exercise identity is related to higher physical activity participation.

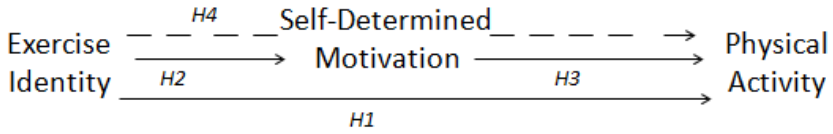
Hypothesis 2: Exercise identity positively predicts self-determined motivation for physical activity. Higher exercise identity is related to more self-determined forms of motivation (i.e., intrinsic, integrated, identified, and introjected). Exercise identity is expected to be related to identified, integrated, and intrinsic forms of behavior regulation because these are the most internalized, self-determined forms of motivation. Additionally, introjected regulation is also expected to be related to exercise identity because individuals may feel guilty about not exercising if the lack of exercise creates a discrepancy with one's identity as an exerciser.

Hypothesis 3: Self-determined forms of motivation for physical activity positively predict physical activity participation. Higher levels of introjected, identified, integrated, and intrinsic motivation are related to higher participation in physical activity.

Hypothesis 4: The effect of exercise identity in predicting physical activity participation is mediated by self-determined motivation. Higher exercise identity is related to more self-determined forms of motivation for physical activity, which in turn predict higher physical activity participation.

Figure 1

Conceptual Model for Exercise Identity, Self-Determined Motivation, and Physical Activity



Research Question 2: Does athletic identity predict self-determined motivation and physical activity participation in former college athletes?

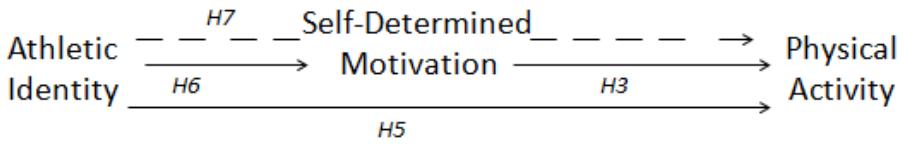
Hypothesis 5: Athletic identity positively predicts physical activity participation. Higher athletic identity is related to greater participation in physical activity.

Hypothesis 6: Athletic identity positively predicts self-determined motivation for physical activity. Higher athletic identity is related to more self-determined forms of motivation (i.e., intrinsic, integrated, identified, and introjected).

Hypothesis 7: The effect of athletic identity in predicting physical activity participation is mediated by self-determined motivation. Higher athletic identity is related to more self-determined forms of motivation for physical activity, which in turn predict higher physical activity participation.

Figure 2

Conceptual Model for Athletic Identity, Self-Determined Motivation, and Physical Activity

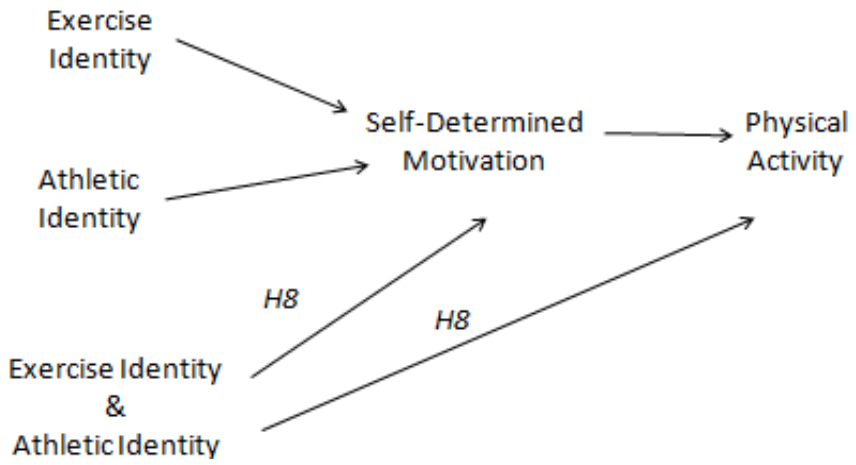


Research Question 3: How does the combination of exercise identity and athletic identity predict self-determined motivation and physical activity participation in former college athletes?

Hypothesis 8: Exercise identity moderates the relationships between athletic identity, self-determined motivation, and physical activity such that the relationship is stronger for individuals who have higher exercise identity scores and weaker for those with lower exercise identity. In this proposed model for research question 3, exercise identity and athletic identity are expected to predict motivation and physical activity as suggested in the models for research questions 1 and 2. However a positive and significant exercise identity-athletic identity interaction effect suggests that the relationship between athletic identity, motivation, and physical activity is stronger if an individual also has a high exercise identity. This interactive effect is expected to be significant beyond the individual contributions of athletic identity and exercise identity in explaining self-determined motivation and participation in physical activity.

Figure 3

Conceptual Model for Combined Effect of Athletic Identity and Exercise Identity in Predicting Self-Determined Motivation and Physical Activity



The hypotheses corresponding to research questions 1, 2, and 3 were tested through structural equation modeling of data collected through surveys completed by 282 former college athletes. Findings add to our understanding of the complex identity, motivation, and behavior relationships in the specific population of former college athletes and provide an evidence base to guide future interventions and programming that can help the more than 400,000 NCAA student-athletes who compete each year to transition into healthy, physically active lifestyles after they graduate.

CHAPTER II

REVIEW OF THE LITERATURE

Research suggests that a person is more likely to maintain his/her physical activity participation when exercise behavior is integrated into the individual's self-identity (Springer, Lamborn, & Pollard, 2013). Maintenance of physical activity is further enhanced when it is motivated by self-determined reasons (Strachan et al., 2012). However, research has not examined the combined role of identity and motivation in predicting physical activity participation among former athletes. Therefore, this study examined the relationships among identity, self-determined motivation, and physical activity participation in former college athletes. The following review of the literature includes an overview of self-perceptions, outlines the role of identity in sport and exercise contexts, and follows with a review of the literature on self-determination theory as it pertains to physical activity participation. Finally, identity and self-determined motivation are tied together into a framework for understanding physical activity behavior of former athletes.

Self-Perceptions and Physical Activity

Self-Perceptions and Self-Concept

Self-perceptions can be defined as "people's thoughts, attitudes and feelings about themselves in general, or about their skills, abilities, and characteristics in a particular

domain" (Gill & Williams, 2008, p. 82). Self-concept is a particular type of self-perception and is descriptive of one's overall sense of self. Several scholars have advocated for a model of self-concept that is both multifaceted and hierarchical (Harter, 1999; Marsh, 1993; Marsh, 1990; Marsh, 1986; Marsh & Shavelson, 1985; Shavelson, Hubner, & Stanton, 1976). In this multidimensional view of self-concept, a person's overall sense of self must be understood in relation to its many facets (Marsh 1986; Marsh & Shavelson, 1985). According to Harter (1999) the extent to which a person feels competent in each of the sub-domains that comprise a person's self-concept (e.g., scholastic, social, athletic, physical, behavioral) will influence his/her global self-worth. Fox and Corbin (1989) specifically narrowed in on the physical domain of self-concept and developed their widely used Physical Self-Perception Profile. According to Fox and Corbin, physical self-perceptions consist of a person's feelings about his or her sport competence, body attractiveness, physical condition, and physical strength. Competence in each of these areas influences physical self-worth. Research has shown that physical self-perceptions predict physical activity participation in children, adolescents, and adults (Hayes, Crocker, & Kowalski, 1999; Raudsepp, Liblik, & Hannus, 2002), and these perceptions can also be developed or enhanced through participation in physical activity (Caruso & Gill, 1992; Fox, 2000).

As has been described, self-concept is a multidimensional construct comprised of the many different identities that individuals rely on as a way of defining themselves (Marsh, 1990). The next section introduces the identity theory framework to focus more

specifically on understanding the role of these specific identities in the formation of self-perceptions and behaviors.

Identity Theory

According to identity theory, identity functions to self-regulate behavior (Burke, Owens, Serp, & Thoits, 2003; Burke & Reitzes, 1981). Individuals monitor their behavior based on whether or not it validates their respective identities. The saliency of a given identity influences how likely a person is to engage in behaviors relevant to that identity. *Identity* is defined as "parts of the self composed of the meanings that persons attach to the multiple roles they typically play in highly differentiated contemporary societies" (Stryker & Burke, 2000, p. 284). Identities are internally produced but are also driven by social processes by which others confirm or validate a person's sense of self. Individuals seek out situations and behaviors that reinforce their respective identities. Confirmation of a particular identity increases its saliency; however if the confirmation process is unsuccessful, the identity is likely to become less salient (Stryker & Burke, 2000). An individual's self-concept is often comprised of multiple identities, some of which reinforce each other while others may conflict. When a situation invokes competing identities that differ substantially in their saliency, the identity that is more salient will drive perceived self-meanings and behavior (Stryker & Burke, 2000).

The link between identity and behavior is based on the meanings attached to both. Identities predict behavior when the meaning of the behavior is in line with the meaning ascribed to an individual's identity (Burke & Reitzes, 1981). Furthermore, a very salient identity more strongly predicts engagement in behaviors that are consistent

with that identity role (Callero, 1985). Though identities are fairly stable, they can change slowly over time as a result of changes to particular roles or groups (Burke & Reitzes, 1991). As a person's commitment to an identity changes, so too does the meaning ascribed to that identity, and, subsequently, the person's behaviors that are congruent with that identity (Burke & Reitzes, 1991).

Two particular identities that have been well-researched in the exercise and sport context are athletic identity and exercise identity. These identities, though similar, are distinct and carry their own associated meanings and behaviors. These constructs are discussed in the sections that follow.

Athletic Identity

As the name suggests, athletic identity can be defined as the extent to which a person identifies him/herself as an athlete. In the literature, the construct has usually been operationalized using the Athletic Identity Measurement Scale (AIMS), which was developed by sport psychology researchers Brewer, Van Raalte, & Linder (1993). Using the AIMS measure (Brewer & Cornelius, 2001), athletic identity is conceptualized as a social identity (i.e., *Most of my friends are athletes*), as potentially exclusive (i.e., *Sport is the most important thing in my life*), and as having a negative affect component in response to the inability to participate in athletic activities (i.e., *I would be very depressed if I were injured and could not compete in sport*).

Athletic identity has been a central construct of interest in sport psychology research over the years, including its relationship to injury recovery (e.g., Brewer, Cornelius, Stephan, & Van Raalte, 2010; Lockhart, 2010; Manuel et al., 2002, Podlog et

al., 2013) and transition to life after retirement from sports (e.g., Lally, 2007; Lally & Kerry, 2007; Lavallee, Gordon, & Grove, 1997). As such, it has been viewed to have both positive and negative aspects. Brewer, Van Raalte, and Linder (1993) suggested in the title of their seminal article on athletic identity that the construct could be viewed as either "Hercules' muscle" or as "Achilles' heel."

People who have very salient athletic identities are likely to value sport in their lives and gain self-worth and competence from their athletic pursuits. However, individuals who over-identify with their athletic role at the expense of developing other identities may struggle to adapt to circumstances when they can no longer participate competitively in sports for reasons such as injury or retirement. As Taylor and Ogilvie (1994) have suggested, retirement from an athletic career presents a possible identity crisis. Thus, researchers have recommended that athletes take proactive steps to dissolve their athletic identity in order to cope effectively with retirement (Lavallee, Gordon, & Grove, 1997; Lally & Kerry, 2007). Houle, Brewer, and Kluck (2010) have shown that athletic identity does decrease after retirement from sport. Using identity theory as a framework for understanding how athletic identity evolves through the retirement transition, we might surmise that as athletic identity becomes less salient, congruent behaviors such as participation in sport and other physical activities may also decline or change in some fashion.

Over a decade after Brewer and colleagues introduced the athletic identity construct, Anderson (2004) proposed an alternative view of athletic identity, and subsequently developed the Athletic Identity Questionnaire (AIQ) to reflect this differing

conceptualization. Anderson criticized the AIMS for several reasons, arguing that it was too narrowly focused on the strength and exclusivity aspects of athletic identity, which have been the central focus of research examining the negative effect of athletic identity on injury and retirement. Therefore, Anderson developed a broader measure of athletic identity that would be a more "general attribute of being athletic" (Anderson, 2004, p. 40). Thus, in addition to sport, the wording of the AIQ was expanded to include exercise and physical activity as part of the definition of athletic identity. Specifically, Anderson's multidimensional view of athletic identity consists of four sub-domains: appearance, competence, importance, and encouragement. Appearance refers to how people judge themselves to be athletes based on whether they think they look physically fit (i.e., *I think I look athletic, like a person who exercises*). Competence describes whether individuals believe they can perform sport/exercise/physical activity well (i.e., *I'm confident of my athletic skills*). Importance describes people who are highly committed to and value sport activities (i.e., *I don't let things get in the way of my exercise/sport activity*). Encouragement refers to whether others support and validate an individual's athletic identity (i.e., *I receive encouragement from others for exercising*).

Though Anderson introduced the AIQ several years ago, its use has not gained popularity in the literature. The AIMS continues to be the most widely used measure for the construct and the basis for how athletic identity is understood in research. As has been argued elsewhere, the AIQ may actually be measuring more of an "exercise" or "physically active" identity than an "athlete" identity (Reifsteck, 2011). Athletic identity is most often conceived as being rooted more specifically in competitive sport. As such,

athletic identity may be related to participation in certain kinds of active behaviors that are consistent with competitive sport training but may not relate to other forms of physical activity participation in the way that exercise identity might. Before examining exercise identity, which is the central focus of the present study, we will first turn our attention to a third related construct, exercise self-schema, which grew out of the physical self-perceptions and identity literature prior to the introduction of exercise identity.

Self-Schema for Exercise

Self-schemas are derived from the most salient and important aspects of identity and form a set of beliefs about the self that guide behavior (Markus, 1977). Exercise-related self-schemas are key to understanding individuals' beliefs and behaviors in the exercise and physical activity context. According to Kendzierski (1988), exercise self-schemas serve as cognitive generalizations about the self which affect how individuals process information about themselves, and in turn, influence their exercise behavior. Individuals who are exerciser schematics view exercise behavior to be extremely self-descriptive of them and important to their self-image. Individuals who are nonexerciser schematics do not view exercise behavior to be descriptive of them nor do they value exercise. Individuals who are exerciser aschematics view exercise to be only moderately descriptive or not descriptive of themselves, and they do not view it as an attribute that is important to their identity. Kendzierski (1988) was the first to use survey methods to classify individuals as exerciser schematics, nonexerciser schematics, and aschematics. She found that exerciser schematics exercised more frequently, participated in more

activities, were more committed to exercising, more interested in exercising, and had higher intentions to exercise in the future.

Building on her exercise self-schema theory, Kendzierski and her colleagues (1998; 2009) later developed a broader model of physical activity self-definitions (PASD). As Kendzierski and colleagues suggest, PASD can change over time; people develop more salient PASD through participation in physical activities, or such physical activity-related identities can become less salient through decreased engagement in activity over time. However, Kendzierski and her colleagues have argued that engaging in physical activity is a necessary but not sufficient requirement for developing PASD. An individual's ability, effort, desire, and commitment to participate in physical activity predict his or her self-definition. In their recent update of the model, which has been supported using structural equation modeling with samples of runners and cyclists, Kendzierski and Morganstein (2009) propose that individuals' enjoyment for a particular activity leads to them wanting to participate in that activity. Their perception of wanting to participate predicts their perceived commitment to the activity as well as their perceived trying to do the activity. Perceived trying also predicts perceived commitment as well as perceived ability for that activity. In turn, perceived commitment and ability both predict an individual's self-definition based on that activity. In sum, individuals will have more salient PASD if they enjoy physical activity, want to participate and try to participate in it, and have a high commitment and the ability to participate.

Exercise Identity

Schemas are cognitive frameworks rooted in a person's identity, with identity representing a person's sense of self over time (Whaley & Ebbeck, 2002). The theories on identity and self-schema suggest that having a self-identity related to exercise should relate to thinking about, valuing, and engaging in exercise. The concept of exercise identity was introduced by Anderson and Cychosz (1994) based on the identity theory framework that suggests role identities give meaning to behavior and guide future behavior. Anderson and Cychosz argued that researchers and practitioners need to better understand the role of exercise identity in the adoption and maintenance of physical activity behavior. They asserted that measuring exercise identity could help identify individuals most and least likely to maintain an exercise program, and understanding the relationship between exercise identity and behavior might aid the development of intervention strategies to enhance long-term adoption of physical activity.

Consequently, Anderson and Cychosz (1994) developed the Exercise Identity Scale (EIS) to measure individuals' self-perceptions rooted in their exercise behavior. The EIS consists of nine items rated on a 7-point Likert scale. The EIS, which demonstrated high internal consistency (α=.94), exhibited a positive relationship with exercise behavior. Anderson and colleagues (2001) found that, on average, exercisers reported exercise identity scores that were approximately one standard deviation above nonexercisers. There were no significant gender differences in exercise identity, though younger people had higher exercise identity scores than older adults. Cardinal and Cardinal (1997) found that exercise identity can change over time. In their study,

exercise identity increased over a 14-week period for individuals who participated in an aerobic exercise class compared to those attending a non-exercise class, and higher exercise identity was related to future exercise participation.

Wilson and Muon (2008) continued the research on measuring exercise identity and suggested a multidimensional rather than a unidimensional model. They argued that exercise identity, as operationalized by Anderson and Cychosz's EIS, reflects both exercise role identity and exercise beliefs. In their research evaluating the psychometric properties of the EIS with 269 undergraduates, they proposed a two-factor structure and found that both exercise role identity and exercise beliefs were positively related to exercise behavior, though the relationship was stronger for exercise role identity.

Research on Identity and Physical Activity

Research on identity and exercise behavior has demonstrated a clear relationship between various physical activity-related identities (e.g., athletic, exercise, physical activity, sport-specific identities) and participation in sport, exercise, and physical activity. For instance, research has shown that athletic identity is positively associated with physical activity participation among current and former athletes (Brewer, van Raalte, & Linder, 1993; Reifsteck, Gill, & Brooks, 2013). Additionally, Strachan and colleagues (2005) found that people who strongly identified themselves as runners had higher self-efficacy for running and also ran more frequently and for a longer duration than those who did not identify strongly as runners. Runner identity also prospectively predicted running behavior four weeks later.

Research on exercise self-schema has also repeatedly shown a positive relationship between high exerciser self-schemata and exercise behavior (Estabrooks & Courneya, 1997; Kendzierski, 1988; Kendzierski, 1990; Yin & Boyd, 2000). Kendzierski (1990) found that exerciser schematics judged a greater number of exercise-related words to be descriptive of them and judged fewer non-exercise words as self-descriptive. They also responded more quickly when presented with exercise stimuli and were quicker to identify non-exercise stimuli as not descriptive of themselves. Additionally, exerciser schematics were more likely to report that they had started an exercise program at a four-week follow-up.

While most research demonstrating a relationship between exerciser self-schemata and exercise behavior has used self-report measures, Estabrooks and Courneya (1997) found a positive relationship with observed exercise behavior as well. In addition to collecting survey data, Estabrooks and Courneya monitored undergraduate students' attendance at university fitness facilities. They found that exerciser schematics had stronger intentions to exercise and also exercised more often than aschematics and nonexerciser schematics. The relationship between intention and behavior was stronger for exerciser schematics. However, one limitation of research on exercise self-schema is that many people do not clearly fall into one of the three schemata classifications based on their survey responses, and finding significant differences between aschematics and schematics is not always consistent (Estabrooks & Courneya, 1997; Yin & Boyd, 2000).

In addition to research on self-schema, several studies have looked at the construct of exercise identity. Research using the Exercise Identity Scale indicates that

exercise identity positively predicts exercise behavior (Anderson & Cychosz, 1994; Anderson, Cychosz, & Franke, 2001). Miller and colleagues (2002) later modified the EIS using broader physical activity language and found that people who participated in moderate to vigorous physical activity had higher physical activity identity and self-efficacy for physical activity than irregularly active or sedentary individuals. Anderson and others have argued for the importance of including exercise identity in research on exercise behavior. When exercise identity becomes a primary and valued component of an individual's self-concept it plays an important role in directing future exercise behavior. Thus, the authors maintain that fostering exercise identity among participants through exercise interventions can promote sustained involvement in exercise. Miller, Ogletree, & Welshimer (2002) suggest that identity and exercise behavior have a reciprocal relationship: engaging in more activity will lead to stronger exercise identity and having a more salient exercise identity leads to maintenance of exercise behavior.

In sum, research on the role of self-perceptions in guiding physically active behavior has shown that when sport, exercise, and physical activity are central to a person's self-identity, the individual is more likely to engage in those activities (Brewer, Van Raalte, & Linder, 1993; Kendzierski & Morganstein, 2009; Reifsteck, Gill, & Brooks, 2013, Strachan et al., 2005). In recent years, researchers have started to look specifically at exercise identity within a motivational framework. In particular, some research has focused on self-determination theory (SDT) as a logically compatible framework because it specifically includes an identity component to motivation.

Self-Determination Theory

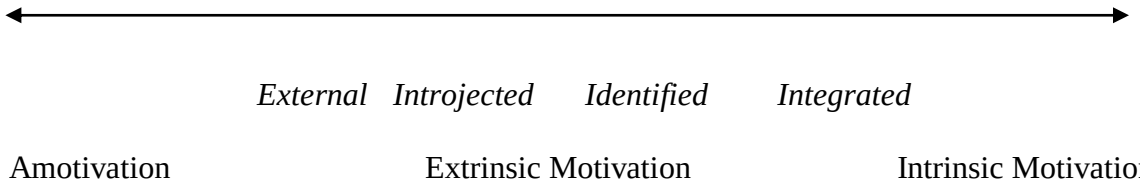
Deci and Ryan (1985) first introduced SDT as a theory of motivation for engaging in behavior. Since its introduction, SDT has been applied specifically to health behaviors and in the exercise context (Ryan, Williams, & Deci, 2009). Ryan and Deci (2000) posit that motivation is more complex than other unidimensional models have suggested. They propose that people do not just differ in their amount of motivation but individuals can also vary in their type of motivation. In addition to how much motivation people have, it is important to understand why individuals are motivated to engage in a particular behavior. Ryan and Deci distinguish between two main types of motivation: intrinsic and extrinsic. People are intrinsically motivated to participate in behaviors that are inherently interesting and enjoyable. To achieve intrinsic motivation, people need to feel a sense of competence and autonomy.

People who are extrinsically motivated engage in a behavior because it leads to another outcome besides the behavior itself. These extrinsic reasons exist along a continuum from totally external to self-determined and volitional. This continuum is comprised of various levels of behavioral regulation (see Figure 4). At the lowest end of the motivation continuum is amotivation. Amotivation describes an individual who is not at all interested in engaging in a particular behavior. The most controlled form of extrinsic motivation is external regulation, when a person is motivated entirely by external rewards or punishments (e.g., a soccer player participates in a spring workout training program because her coach mandates it). When such external factors disappear, an individual is not likely to maintain the behavior because the reasons for participating

were not internalized. The next level of the continuum is introjected regulation. Introjected regulation describes an individual who engages in a behavior to avoid guilt or to enhance self-worth (e.g., not exercising makes a person feel badly about her/himself). Introjected regulation is also based on rewards and punishments, which is still controlling, but it represents a greater degree of internalization than external regulation. Identified regulation represents movement toward more internalized and self-determined motivation and occurs when an individual values the behavior as important to the self and to achieving self-identified goals (e.g., a track athlete participates in resistance training because she believes it will help her improve her personal record time in the 100m). Integrated regulation is the most autonomous and self-determined form of extrinsic motivation and is achieved when identified regulations become integrated with the person's sense of self (e.g., a basketball player trains for her sport because it is part of her identity).

Figure 4

SDT Motivation Continuum



Few behaviors in adulthood are entirely intrinsically motivating; however, the key to long-term adherence for a given behavior is fostering more active and volitional forms of extrinsic motivation rather than passive and controlling forms. People can move up

and down this motivation continuum depending on various factors. Sport and exercise activities are often motivated by extrinsic reasons (Ryan, Williams, & Deci, 2009). Generally people experience varying levels of both intrinsic and extrinsic motivation for sport and exercise. The main reason people say they play sports is because they enjoy them; however, the environment often undermines feelings of competence and autonomy that are requisite for intrinsic motivation. When people are amotivated to engage in physical activity, they likely have a lack of competence for the activity, do not value the activity, or do not believe that it will achieve a desired outcome (Ryan, Williams, & Deci, 2009). Fulfilling the basic psychological needs of autonomy, competence, and relatedness will foster greater internalization of the behavior and enhance motivation in the direction of self-determination. In the exercise setting, a person is likely to be motivated if they perceive a sense of agency within the activity, experience improved competence in related skills, and feel connected to others through the activity. Research by Edmunds and colleagues (2006) and Wilson, Rogers, and Fraser (2002) support the theory that fulfillment of these needs is related to more self-determined behavioral regulation and more frequent participation in exercise behavior.

Support for SDT in Research on Exercise

To test the behavioral regulations outlined in self-determination theory within the exercise context, the Behavioral Regulation in Exercise Questionnaire (BREQ) was developed by Mullen, Markland, and Indeglew (1997). This original scale only included sub-factors for external, introjected, identified, and intrinsic motivation. Markland and Tobin (2004) later modified the BREQ to include an amotivation subscale. The revised

measure, which was labeled the BREQ-2, showed moderately good internal consistency (α=.83) for the new subscale, and the other subscales had acceptable internal consistency as well (α ranged from .73-.86). More recently, McLachlan and others (2011) developed a subscale for integrated regulation and validated it for use with the BREQ-2. The integrated subscale had been omitted previously because of difficulties with discriminating it from identified and intrinsic forms of motivation. The added subscale, which includes four items on a 5-point Likert scale, demonstrated strong internal consistency (α =.92) and also followed an appropriate simplex pattern and had minimal cross-loading with the other subscales. The model including the new integrated subscale was invariant across low and high active groups. Further making the case for inclusion of this subscale, the authors found that the integrated subscale was actually the only significant independent predictor of exercise behavior.

Research studies have generally supported the tenets of behavioral regulation in SDT and the importance of self-determined motivation in exercise contexts (e.g., Edmunds, Ntoumani, & Duda , 2006; Markland & Tobin, 2004; McLachlan et al., 2004; Thorgersen-Ntoumani & Ntoumanis, 2006; Winninger, 2007). Thorgersen-Ntoumani and Ntoumanis (2006) found that participants who were in the maintenance stage of exercise (i.e., exercising for more than 6 months) had higher intrinsic motivation for exercise, higher identified and introjected regulation, and lower external regulation and less amotivation. Additionally, high identified regulation and intrinsic motivation were related to future intentions to exercise, self-efficacy to overcome barriers to exercise, and physical self-worth. On the other hand, exercise intentions, self-efficacy, and physical

self-worth were negatively related to external regulation and amotivation. Interestingly, Edmunds, Ntoumani, and Duda (2006) found that both introjected and identified regulations predicted involvement in strenuous exercise, but intrinsic motivation did not make an independent contribution. The authors suggested that most people do not maintain exercise simply for intrinsic enjoyment; instead, valuing physical activity and its benefits are particularly important for participating in activity. However, intrinsic motivation is likely important for long-term exercisers.

Barbeau, Sweet, and Fortier (2009) surveyed 116 undergraduate students regarding their psychological needs satisfaction, self-determined motivation, and physical activity participation at an initial time point and a one-month follow-up. Using path analyses, they found support for a model where fulfillment of the basic psychological needs predicted more self-determined motivation, which in turn predicted physical activity participation one month later. Competence was found to be the strongest predictor of self-determined motivation, though autonomy and relatedness were also significant predictors. In sum, research by Barbeau and others have continued to provide support for the application of SDT in exercise contexts.

Combining Identity Theory and SDT to Understand Exercise Behavior

Because SDT posits that people are more likely to engage in a behavior and maintain their engagement if the behavior has been integrated with their self-identity (i.e., exercise because it is part of who you are), it is logical to examine how exercise identity and exercise behavior fit within the SDT framework. Strachan and colleagues (2012) attempted to combine identity theory and self-determination theory by looking at whether

the strength of exercise identity was related to type of behavioral regulation. They found that exercise identity was indeed associated with the more self-determined forms of behavioral regulation. Individuals who identified strongly with exercise also reported high levels of integrated regulation. The authors concluded that strongly seeing oneself as an exerciser is related to a greater capacity for self-regulation of exercise, which is further enhanced when the person engages in an activity that is motivated by identified reasons.

Vlachopoulos and others (2011) examined how motivation can shape and maintain exercise identity. Motivational regulations explained a substantial amount of variance in exercise identity (43%) and exercise beliefs (64%) even after controlling for age, BMI, and gender. More self-determined forms of motivation were positively related to exercise role identity and beliefs, and fulfilling the basic psychological need for competence was most strongly associated with exercise identity.

Wilson and Muon (2008) also examined the relationship between exercise identity and self-determined motivation. They found that greater psychological needs satisfaction was related to higher exercise role identity and beliefs. In particular, perceived competence was most strongly related to exercise identity. Exercise identity and psychological needs satisfaction were both related to exercise frequency. Wilson and Muon concluded that research should embrace self-determination theory as a theoretical framework for understanding identity in exercise contexts.

Furthering research in this area, Springer, Lamborn, and Pollard (2013) recently conducted a grounded theory qualitative analysis through interviews with exercise participants. They found that fulfillment of the basic psychological needs of competence,

autonomy, and relatedness was related to physical activity engagement. Participation in physical activity was also related to having a physically active self-image. Being physically active was central to these participants' identity, and tailoring exercise to promote their psychological needs fulfillment resulted in the formation of a more stable physically active self. From their findings, Springer and colleagues concluded that internalizing exercise behavior through psychological needs fulfillment leads to the incorporation of exercise as a defining element of self-identity. Thus, recent research that has investigated exercise identity within the SDT framework provides support for the marriage of these two theories.

Identity, Motivation, and Exercise among Former Athletes

Physical Activity Participation in Former Athletes

Extensive research exists on athletes and the retirement transition process in relation to identity and emotional and career transitions (e.g., Douglas & Carless, 2009; Houle, Brewer, & Kluck, 2010; Lally, 2007; Lally & Kerr, 2005; Lavallee, Gordon, & Grove, 1997; Stambulova, Alfermann, Statler, & Cote, 2009; Taylor & Ogilvie, 1994). However, there is a scarcity of research that has focused on how college athletes transition to physically active lifestyles (Reifsteck, Gill, & Brooks, 2013). Much of the research on physical activity participation among former athletes has focused on elite male athletes. Backmand and colleagues (2010) found that former elite male athletes may be more likely to maintain an active lifestyle over time than non-athlete referents. Additionally, Finnish researchers (Sarna et al., 1993) found that former elite Finnish male athletes reported living healthier and more active lifestyles than non-athlete referents.

The former athletes also had a longer average life expectancy, which was mostly explained by decreased cardiovascular mortality among former athletes, especially those who had participated in endurance sports.

Other research, however, has shown that many former athletes struggle with maintaining their activity after retirement from their sport career. Stephan and colleagues (2003a; 2003b) contend that the active, performing body is important to the construction of identity for athletes, and athletes' self-esteem is often rooted in athletic performance. The researchers found that retired French elite athletes' perception of their physical condition and self-worth decreased as a result of less participation in exercise following their transition out of competitive sport. Their self-perceptions eventually improved in later months following reevaluation of the self after adapting to their new body state; however, these perceptions still remained lower than currently active athletes. Stephan and colleagues also found that most athletes experienced a newly sedentary lifestyle during their transition out of sport. It was not until about eight months after retirement that some athletes began to re-engage in physical activity, which was often initiated in response to experiencing negative physical changes to their body after retiring from sport. The authors recommended that transitioning athletes participate in a "detraining program" to avoid an abrupt change in their physical lifestyle that may threaten an athlete's identity and physical self-worth.

Little research has been conducted with college athletes, who are different from elite, professional, or Olympic athletes. In contrast to Backmand et al.'s (2010) research, Reifsteck, Gill, and Brooks (2013) found that former college athletes were actually no

more active than non-athlete college alumni, and a substantial portion of the former athlete group was sedentary. These findings with college athletes combined with some data on more elite athletes suggest that at least some athletes struggle with transitioning to physically active lifestyles after they retire from competitive sport. This is particularly concerning as Witkowski and Spangenburg (2008) suggest that athletes who become sedentary after retirement are at risk for developing various cardiovascular and metabolic health problems. Becoming sedentary after retirement from their competitive careers can quickly reverse the benefits gained from many years of training. For example, Liu et al. (2008) found that short detraining periods of 10-30 days resulted in reduced insulin sensitivity among elite runners and kayakers. Gill and colleagues (2003) showed that even one week of inactivity resulted in increased serum triglycerides.

Witkowski and Spangenburg (2008) contend that a substantial drop in activity among retired athletes may put them at the same or even greater risk for developing chronic health issues compared to the generally inactive population. Unlike individuals in the general population who may become inactive after initiating an exercise program, former athletes are likely to experience a much more severe drop in their physical activity participation after retiring from sport. College athletes devote many years to training and developing their physical skills. During their collegiate careers, student-athletes may spend several hours per day in physical training or competition. These athletic activities are a very structured part of a student-athlete's collegiate experience, and academic course schedules and other activities are often planned around practices and games. Maintaining this high level of activity is a difficult challenge for many athletes whose

priorities likely change upon retiring from their collegiate career as many of them pursue new professional careers, graduate school, and/or start families. Despite athletes spending many years building their fitness and improving their health, a severe drop in activity following high levels of regular training can place "a significant strain … on the molecular/ cellular/ biochemical profile of the muscle" (Witkowski & Spangenburg, 2008, p. 953). Thus, long term benefits of an active lifestyle among athletes largely depend on whether athletes remain active throughout their lives (Sarna et al., 1993).

The Role of Identity and Motivation in Former Athletes' Physical Activity

Though research applying identity and self-determination theory to understand behavior is growing, research with current and former athletes has seemed to apply these theories only in separation. Research on athletic identity suggests that athletes have higher athletic identity than non-athletes (Brewer Van Raalte, & Linder, 1993) even after retiring from their competitive sport careers (Reifsteck, Gill, & Brooks, 2013). However, athletic identity tends to decrease after retirement from competitive sport (Houle, Brewer, & Kluck, 2010), and many scholars have advocated that former athletes' should disengage from their athletic identity in order to cultivate other salient identities to promote a more healthy retirement transition (Lally, 2007; Lally & Kerr, 2005; Lavallee, Gordon, & Grove, 1997).

As their athletic identity becomes less salient, it is possible that former athletes may become less active in sport and less active overall. Indeed, Reifsteck, Gill, and Brooks (2013) found that former college athletes were no more likely to be physically active than non-athletes, and close to a third were currently sedentary or reported that

they had been so in the past six months. While athletic identity was related to physical activity engagement among these former college athletes, a large portion of the variance was unaccounted for by athletic identity alone. Related thesis research by Reifsteck (2011) examined athletic identity as it relates to physical activity participation in former college athletes using two different measures of athletic identity. The first was the AIMs, which is the traditional measure of athletic identity that is more sports-specific. The second was the AIQ, a broader measure of athletic identity that is conceptually similar to the exercise identity construct of interest in the present study. Though the sports-specific measure of athletic identity was positively related to physical activity participation (r=.360, p<.01), having a broader exercise-based athletic identity was more strongly related to physical activity (r=.529, p<.01). Furthermore, the AIMS and the AIQ were not significantly related to each other (r=.058, p=.67). These findings suggest that "athletic" identity and "exercise" identity are not equivalent constructs. Though research on exercise identity has consistently shown a strong relationship with exercise behavior, it is not clear whether athletes transition from a salient athletic identity to a salient exercise identity. Because identity can change over time (Kendzierski, Furr, & Schiavoni, 1998), it is likely that former athletes who do not maintain their activity level after retirement do not identify as strongly with sport and exercise behaviors. Reifsteck (2011) found that former Division I student-athletes do experience a clear drop in their athletic identity through their transition out of college sports. While 97% of individuals surveyed indicated that they identified themselves as athletes "completely" or "quite a lot" during college, only 51% identified themselves that way presently. As identity theory

suggests, this change in identity saliency may have implications for related behaviors such as sport and physical activity participation.

Research using self-determination theory suggests that competitive athletes tend to be more extrinsically focused than recreational athletes (Ryan, Williams, & Deci, 2009). Furthermore, SDT posits that extrinsic rewards can serve to undermine intrinsic motivation, which may be an important issue for college athletes who are often motivated by scholarships and related benefits, as well as by coaches, teammates, trainers, and fans. When these external motivators disappear after athletes are no longer competing, their motivation to be active may also dissipate. However, as research combining identity theory and SDT with the broader population has suggested, individuals who maintain their active identities may continue to engage in more self-determined forms of behavior regulation and thus engage in greater amounts of activity. However, sport is arguably more intrinsically motivating than exercise (Ryan, Williams, & Deci, 2009); thus, transitioning from sport-based activity to exercise-based activity may be particularly difficult for college athletes who transition to life after competitive sport. Results from preliminary research by Reifsteck (2011) support the notion that motivation to exercise is impacted by the transition out of college sports. Most of the former Division I athletes surveyed indicated that they were less active now compared to when they were in college. When asked why their activity had changed, a lack of motivation emerged as a major theme. Many of their reasons were relevant to the basic psychological needs outlined in self-determination theory. See Table 1 for examples of participant quotes

reflecting motivational barriers to physical activity after retirement from competitive sports.

Table 1

*Motivational Barriers for Physical Activity in Former College Athletes**

Category	**Illustrative Quote**
General Motivation	I have been lazy and lost my enthusiasm to workout.
General Motivation	Since I am no longer competing and am not on a team I do not have to make the commitment to work out every day.
General Motivation	We used to run to win races; Running to stay in shape isn't as great a motivator.
Autonomy	(My activity) has changed because I no longer have someone forcing me to be in a certain physical shape.
Relatedness	I don't have that team environment … It's hard to go out and run hard when you don't have 6-7 guys doing it with you.
Competence	Everyone expects you to be able to do the things you did in college and have the same amount of athletic ability as you did in college.

**Quotes selected from unpublished data resulting from author's prior thesis project (Reifsteck, 2011)*

In summation, though research has not examined exercise identity, athletic identity, self-determined motivation, and physical activity concurrently in former athletes, the existing evidence suggests that identity and motivation issues are both impacted by the transition out of competitive sport and seem to be related to physical activity participation following the transition. Examining these variables in a singular model will help further elucidate the complex relationships underlying these constructs and provide a clearer understanding of physical activity determinants in former athletes.

Summary

Research and programs have not typically emphasized physical activity and health behaviors for student-athletes after they retire from their collegiate careers. Given that research suggests this is a clear issue for some athletes and that there are related negative health implications, this is an important issue that needs to be addressed through research. Incorporating identity theory into a self-determination theory framework provides promising directions for such research with former college athletes. Identity theory suggests that individuals engage in behaviors that are congruent with and reinforce their self-perceptions, such that people who see themselves as active persons are more likely to engage in physical activity. Self-determination theory posits that motivation is enhanced through the fulfillment of the three basic psychological needs of competence, autonomy, and relatedness. When individuals are motivated by more self-determined reasons, they are more likely to be physically active. Recent research combining these theories has indicated that when physical activity is integrated into a person's self-identity, they have higher self-determined motivation for the activity and are also more likely to engage in physical activity. The objective of this study is to extend the emerging research in this area by examining identity and self-determined motivation together to clarify their relationships to physical activity participation in former college athletes.

CHAPTER III

METHODS

The purpose of this study was to examine the interrelationships among identity, self-determined motivation, and physical activity in former college athletes. Specifically, the independent and combined effects of exercise identity and athletic identity on predicting self-determined motivation for physical activity and participation in physical activity were examined using structural equation modeling techniques based on survey research with former college athletes.

Participants

The sample in this study was comprised of former student-athletes who competed at a Division I institution. Division I is considered the most competitive and elite level in college sports, and the majority of athletes receive athletic scholarships, which is different from other collegiate divisions. In order to keep the sample fairly homogenous for initial model testing, the sample was limited to young adult Division I former athletes 35 years or younger. University athletic departments were contacted to request their assistance in contacting former student-athletes to participate in this study. Participants were also recruited through an announcement on the social networking site, Facebook. Data from 282 former Division I student-athletes 35 years old or younger are included in this study, which is sufficient for sample size recommendations for path analyses (Kline,

2010; see section on data analysis). Descriptive information on the sample is provided in the Results section.

Measures

BREQ-2

The Behavioral Regulation for Exercise Questionnaire Version 2 (BREQ-2; Markland & Tobin, 2004) is a multidimensional measure of motivation comprised of several subscales that represent the continuum of motivation in SDT. The BREQ-2 was revised from the original instrument (Mullen, Markland, & Indegew, 1997) to include an amotivation subscale. Internal consistency of the subscales range from $\alpha = .73$ to .86 (Markland & Tobin, 2004). The BREQ-2 includes amotivation (not motivated at all), external (motivated by rewards and punishments), introjected (motivated by feelings of guilt or self-worth), identified (motivated because activity is valued and important to personal goals), and intrinsic (activity is inherently enjoyable) subscales. Integrated, the most self-determined form of extrinsic motivation (participate because activity is part of who you are), was initially excluded because of difficulties discriminating it from identified and intrinsic motivation. However, McLachlan and colleagues (2011) developed and validated an integrated subscale for use in conjunction with the BREQ-2. The added subscale demonstrated excellent internal consistency ($\alpha = .92$) with minimal cross-loading. Individual items for the six motivation subscales are rated on a 5-point Likert scale. The introjected subscale is comprised of three items while there are 4 items included for each of the other five subscales (i.e., amotivation, external, identified, integrated, intrinsic). Each item is rated on a 5-point Likert scale ("not true for me" to

"very true for me"). Total scores for each subscale, which can range from 1 to 5, are obtained by summing respective items and computing an average score across the number of items in the subscale. Reliabilities for the motivation subscales were assessed in the current sample and indicated acceptable to excellent internal consistency for all subscales (see Table 2 for α coefficients and other descriptive statistics). Additionally, the disattenuated correlations among the subscales after accounting for imperfect reliability are presented in Table 3.

EIS

Exercise identity was measured using the Exercise Identity Scale (Anderson & Cychosz, 1994). The EIS is a 9-item measure with each item rated on a 7-point Likert scale ("strongly disagree" to "strongly agree"). Responses to each item are totaled for a summative score. Exercisers have been shown to score on average 1 standard deviation higher compared to non-exercisers (Anderson et al., 2001). The measure has demonstrated high reliability, α=.94 (Anderson & Cychosz, 1994). Wilson and Muon (2008) questioned the univariate structure of the EIS and suggested that a 2-factor version of the scale that includes "identity" and "beliefs" subscales was preferred over the 1-factor version. A total score, with a possible score ranging from 9-63, was ultimately used for the present study based on preliminary measurement analyses (see Results section). Reliability for the EIS was assessed with the current sample, and the scale demonstrated excellent internal consistency, α=.92.

AIMS

Athletic Identity was measured using the Athletic Identity Measurement Scale (Brewer, Van Raalte, & Linder, 1993, Brewer & Cornelius, 2001). The AIMS was first introduced as a 10-item questionnaire with each item rated on a 7-point Likert scale ("strongly disagree" to "strongly agree"). However, validation research on the AIMS suggested a revised 7-item version of the AIMS was more appropriate, which includes three subscales: social identity, exclusivity, and negative affectivity (Brewer & Cornelius, 2001). Most research using the AIMS has utilized a total score for analyses (Visek, Hurst, Maxwell, & Watson, 2008), with possible score ranging from 7 to 49. The AIMS is the most-widely used measure of athletic identity and has been previously shown to be a reliable measure of athletic identity (Brewer, Van Raalte, & Linder, 1993; Brewer & Cornelius, 2001; Visek et al., 2008). Reliability of the 7-item AIMS was assessed in the current sample, and the measure demonstrated good internal consistency, α=.82.

Table 2

Scale Descriptives in Current Sample

	AIMS	EIS	BREQ (intri)	BREQ (integ)	BREQ (ident)	BREQ (intro)	BREQ (ext)	BREQ (amot)	Godin
α	.82	.92	.89	.90	.74	.80	.78	.80	*N/A*
M	31.49	45.31	4.10	3.70	4.28	3.21	1.59	1.13	43.36
SD	8.81	12.02	.80	1.05	.68	1.07	.71	.34	22.66
Range	7-49	9-63	1-5	1-5	2-5	1-5	1-4.5	1-4	0-114

N=282 (*N*= 281 for EIS). *Note:* Range refers to minimum and maximum scores observed within the present sample.

Table 3

Disattenuated Correlations for Motivation Subscales

Variable	1	2	3	4	5	6
1. Amot	1.00					
2. Ext	.41	1.00				
3. Intro	-.18	.37	1.00			
4. Ident	-.49	-.36	.50	1.00		
5. Integ	-.31	-.20	.50	.92	1.00	
6. Intri	-.32	-.42	.14	.84	.72	1.00

N=282

Godin

The Leisure-Time Exercise Questionnaire (Godin & Shephard, 1985), also known as simply the Godin, was used as the measure of physical activity participation. The Godin asks questions related to how frequently individuals engage in bouts of physical activities (light, moderate, strenuous) and then uses an equation to calculate a unit score for weekly physical activity: (frequency of strenuous activity/wk X 9) + (frequency of moderate activity/wk X 5) + (frequency of light activity/wk X 3). A higher score indicates higher weekly physical activity levels. Initial reliability research on the measure was deemed acceptable, and reviews of physical activity measures have supported the use of this questionnaire in research (e.g., Jacobs et al., 1993). In a recent update, Godin (2011) suggested using only the moderate and strenuous activities in calculating a total weekly score as this is believed to be a better indicator of physical activity from a health contribution standpoint. Thus, the total Godin score for the present study was computed with the equation: (frequency of strenuous activity/wk X 9) + (frequency of moderate activity/wk X 5). According to Godin's (2011) cut points for

health benefits, individuals in the current sample who had a total score above 24 units were categorized as active with substantial health benefits; scores of 14-23 units were considered moderately active with some health benefits; and scores below 14 were deemed insufficiently active with low benefits to health. The Godin continues to be a widely used self-report measure of physical activity (Godin, 2011).

Demographics

Participants were asked to provide background information including gender, age, race/ethnicity, education, occupation, sport(s) played in college, current sport participation, injury status, and stage of exercise (e.g., precontemplation, contemplation, preparation, action, and maintenance; Marcus, Selby, Niaura, & Rossi, 1992).

Procedures

Following approval from the university Institutional Review Board and from officials in participating athletic departments, an email containing a hyperlink for the informed consent and survey was sent to former Division I student-athletes. A total of four Division I athletic departments sent the survey to their student-athlete alumni. These athletic departments included one small private university located in the Northeast, one large public university in the Northeast, one mid-size public university in the Midwest, and one mid-size public university in the Southeast. The survey link was also posted to the social networking site, Facebook, to recruit additional former college athletes. Using the provided link, the BREQ-2, AIMS, EIS, Godin, and demographic measures were administered electronically through the *Qualtrics* online survey software. Voluntary consent and directions were provided at the site, and participants submitted their answers

electronically. At the time of data analysis, 413 people had clicked on the link, but only 377 continued on to answer the first question, with more drop out occurring throughout the survey. In total, 321 people responded to the entire survey. Of the 321 completed surveys, 35 individuals were excluded from data analysis for this study because they were outside of the 35 years and younger age range. An additional four people within the target age range were excluded because they indicated on the survey that they were not Division I student-athletes. A final sample of 282 former college athletes was included in this study.

Data Preparation and Preliminary Analyses

Data were downloaded from Qualtrics and entered in SPSS, scores were calculated for each survey scale, and the data were pre-screened for multivariate normality. Additionally, confirmatory factor analysis (CFA) was used to examine the structure of the BREQ-2, AIMS, and EIS measures. Measurement issues are particularly relevant in structural equation modeling, so it was necessary to examine the psychometric properties of the scales that were used to represent the variables of interest. CFAs using unit loading identification were employed by setting the unstandardized loading to 1 for one of the indicators for each respective factor. Model fit for each scale was assessed using several fit indices, including chi-square goodness of fit, root mean square error of approximation, comparative fit index, and standardized root mean square residual. The chi-square analysis tests whether the model-implied covariance matrix equals the observed covariance matrix. Ideally, the chi-square test for model fit will not be significant; however, a rejection of model fit with the chi-square analysis is known to be

overly sensitive with large sample size. Therefore, the other indices were also examined. The root mean square error of approximation (RMSEA) accounts for parsimony in the fit assessment. If the value falls below .08, with the 90% confidence interval falling below .05 (good fit) or at least below .10 (acceptable fit), then there is evidence to support the model. The comparative fit index (CFI) tests for whether the proposed model fits better than a null model, and the value should be above .90, with excellent fit indicated by a CFI value greater than .95. The standardized root mean square residual (SRMR) is the difference between estimated and observed correlations and should fall below .08 with model fit improving the closer the value is to 0. A model was considered to fit the data when at least two of the model fit indices suggested favorable model fit (Hu & Bentler, 1999). When model fit was poor and loadings were low, modification indices and residuals were examined.

Data Analysis

To address the first research question, which examines the relationships among exercise identity, self-determined motivation, and physical activity, a path analysis was conducted using structural equation modeling in LISREL 8 software. SEM is a family of analyses that are used to model relationships among variables. SEM assesses how well the estimated covariance matrix implied by the proposed model captures the actual observed covariance matrix. The model, which is illustrated in Figure 5, was specified according to SDT and identity theory and in line with previous research findings. The focus of this study was on identity and the more self-determined types of motivation, but for completeness, external motivation and amotivation were included in this model as

well as the subsequent models. The model was specified as proposed to determine initial model fit. The same fit indices used in the preliminary analyses (i.e., chi-square, RMSEA, CFI, SRMR) were examined similarly in this path analysis. The significance of individual unstandardized path loadings was also examined to determine how these relationships contributed to the model. The magnitude and direction of standardized coefficients were considered to determine whether they followed hypothesized predictions. When there was poor model fit, modification indices were examined but any respecifications to the model were justified on a theoretical basis. The significance of the direct effect of exercise identity on physical activity was examined to determine whether the effect of exercise identity on physical activity participation was fully or partially mediated by the more self-determined forms of motivation.

The same path analysis conducted for research question 1 was also conducted for research question 2 but with athletic identity substituted in the place of exercise identity (see Figure 6). The same procedures were followed to examine model fit and standardized path loadings. The significance of the direct effect of athletic identity on exercise was examined to determine whether the effect of athletic identity on physical activity participation was fully or partially mediated by the more self-determined forms of motivation.

The third research question examined the combined influence of exercise identity and athletic identity in predicting self-determined motivation and physical activity (see Figure 7). The hypothesis was tested using an interaction term comprised of the product of athletic identity and exercise identity scores centered around their means. A positive

and significant interaction term was expected, which provides support for the hypothesis that the athletic identity-motivation-behavior relationship is stronger for individuals with high athletic identity who also have high exercise identity, and weaker for those with low exercise identity. The combined effect of athletic identity and exercise identity was an exploratory aspect of the study given that research has not specifically examined the role of athletic identity within the exercise identity-motivation-activity framework. Although SEM is a confirmatory approach, it also allows for some exploratory analyses. The proposed moderation model is theoretically justified and this exploratory analysis can enhance the current understanding of identity, motivation, and behavior. The results are interpreted cautiously and any modifications using statistical insights were theoretically defensible.

Figure 5

Hypothesized Relationships for Research Question 1

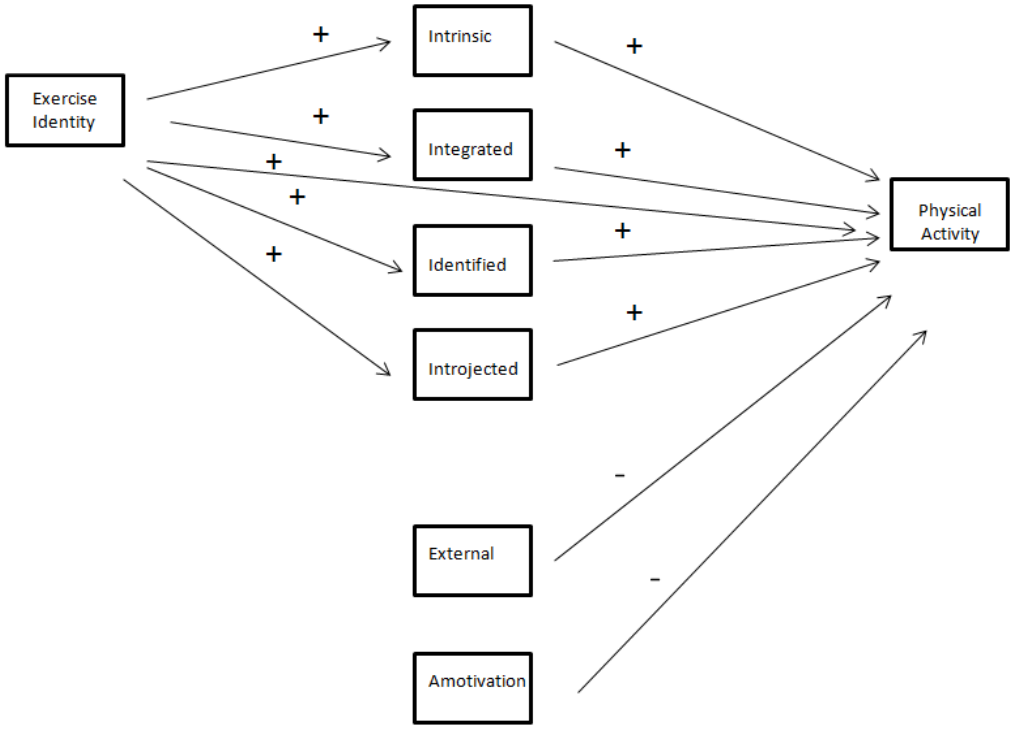


Figure 6

Hypothesized Relationships for Research Question 2

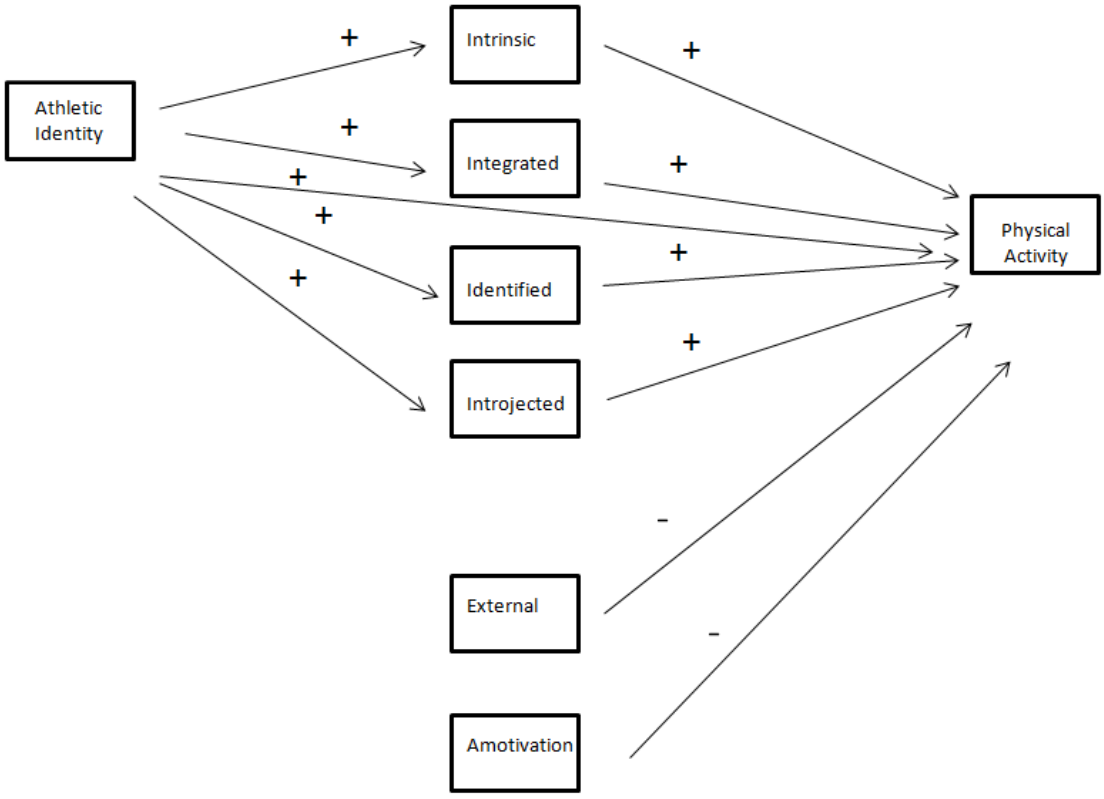
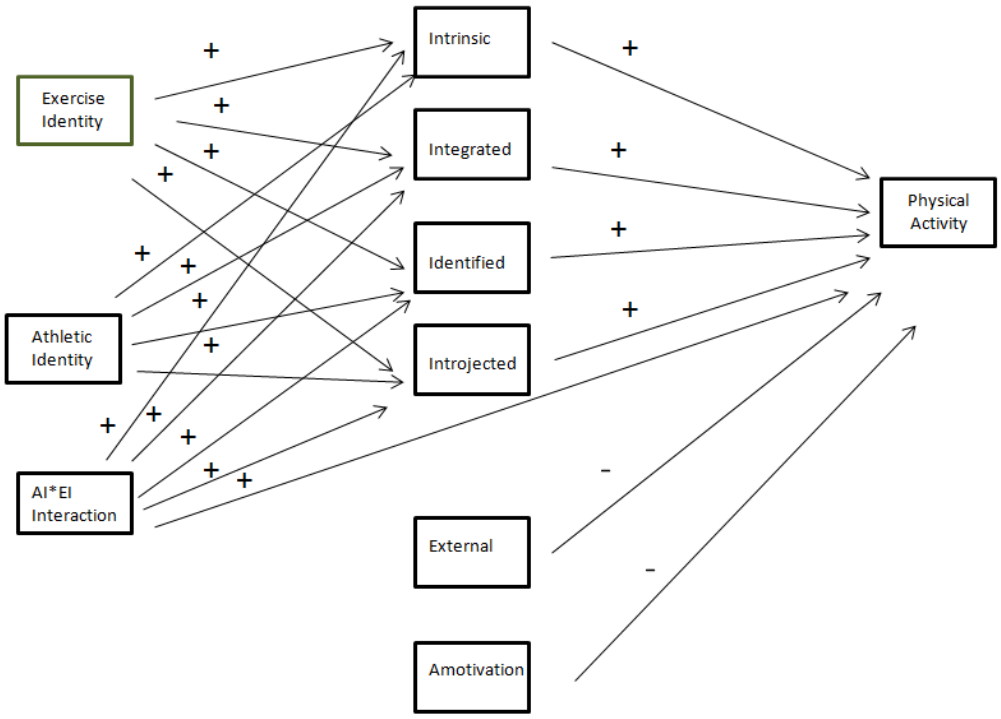


Figure 7

Hypothesized Relationships for Research Question 3



CHAPTER IV

RESULTS

The purpose of this study was to examine the interrelationships among identity, self-determined motivation, and physical activity in former college athletes. Preliminary analyses of the survey scales were conducted using confirmatory factor analysis (CFA) in LISREL 8 software. Subsequently, the independent and combined effects of exercise identity and athletic identity on predicting self-determined motivation and physical activity were examined using path analyses in LISREL. These path analyses examine the pattern of direct and indirect effects among the variables.

Sample Description

The sample consisted of 282 former Division I student-athletes. The 282 participants (age *M*= 27.73, *SD*=3.50) included 94 men, 187 women, and one individual who did not specify a gender identity. The sample was largely comprised of White/Caucasian (*N*= 243) and African American (*N*=24) individuals, though participants from other racial/ethnic backgrounds were also represented and some individuals selected more than one racial/ethnic identity, including Hispanic/Latino/a (*N*=8), Mixed (*N*=5), Asian (*N*=3), Other (*N*=2), Native American (*N*=1), African Canadian (*N*=1), and Indian (*N*=1). Most of the participants (90%) reported that they were currently employed, and 21% reported that they were currently students.

Almost half (45%) of the sample concluded their collegiate career within the past 5 years, another 37% finished within the past 6-9 years, and 18% had finished 10 or more years ago. College sports represented in this sample included baseball, basketball, swimming/diving, field hockey, cheerleading/dance, cross country/ track and field, lacrosse, football, golf, tennis, rowing, soccer, softball, volleyball, gymnastics, ice hockey, and wrestling. A few individuals were two-sport athletes. See Table 4 for number of participants in each sport.

Table 4

Sport Classification

Sport	Total	M	F	NS
Baseball	16	16	0	
Basketball	12	4	8	
Cheerleading/ dance	6	0	5	1
Cross country/ track & field	39	16	23	
Field hockey	32	0	32	
Football	25	25	0	
Golf	7	1	6	
Gymnastics	9	0	9	
Ice hockey	1	0	1	
Lacrosse	3	0	3	
Rowing	3	1	2	
Soccer	32	15	17	
Softball	21	0	21	
Swimming/diving	23	7	16	
Tennis	15	4	11	
Volleyball	26	2	24	
Wrestling	2	2	0	
Field hockey and Lacrosse	3	0	3	

Swimming and Cross country/ track & field	3	0	3
Swimming and Field Hockey	1	0	1
Swimming and Soccer	1	0	1
Softball and Basketball	1	0	1
Not specified	1	0	1

N= 282. *Note:* M= male, F= female, NS= not specified

Participants reported that they continued to be involved in the sport they played during college in a variety of ways, including participating in a community or recreational league (*N*= 117), in a club league (*N*= 41), and/or professionally (*N*= 12). Of the individuals who reported participating at a professional level, closer examination of follow-up responses indicated that most of the individuals had professional occupations related to their sport (i.e., coaching, administration, teaching lessons, etc.), rather than playing their sport professionally. However, two individuals listed professional athlete as their current occupation. Half of the sample (*N*= 140) reported that they no longer play the sport they played in college. Some participants indicated that they remain involved with their sport as coaches, fans, referees/officials, and administrators, or that they were no longer involved in their sport in any capacity.

Current injury status was also assessed in the sample as this may affect physical activity participation. Sixty-three people indicated that they had an injury or physical condition that might limit their physical activity, but there were no significant differences in physical activity levels between those who reported an injury (*M*= 43.54, *SD*= 24.67) and those who did not report an injury (*M*=43.31, *SD*=22.11), t(280)=-.07, p=.94. Therefore, injury status was not controlled for in subsequent analyses.

The large majority of the sample (76%) reported being regularly physically active for at least 6 months (maintenance stage). Close to 13.5% reported that they were not regularly active (pre-contemplation through preparation stages), and another 10.5% indicated that they only recently became active in the past few months (action stage). Therefore almost a quarter of the sample reported sedentary behavior within the past six months. In terms of being physically active for health benefits, according to Godin's (2011) cut-off scores for achieving health benefits, 82.6% reported scores indicating that they were active enough to obtain substantial health benefits (i.e., 24 or more units), 7.4% were considered moderately active with some health benefits (i.e., 14-23 units); and 10% reported activity levels considered insufficiently active with low benefits to health (i.e., < 14 units). See Table 5 for information on activity level within the sample.

Table 5

Activity Level Classification

Stage/Activity Level	*N*
Pre-contemplation	3
Contemplation	9
Preparation	26
Action	30
Maintenance	213
N= 281	
Active, substantial health benefits	233
Active, some health benefits	21
Insufficiently active, low health benefits	28
N=282	

Results of Preliminary Analyses

Prescreening of the data indicated that there was some evidence of univariate skew and kurtosis, which suggests some violation to the assumption of multivariate normality. Relying on fit indices and standard error estimates obtained from maximum likelihood estimation with data that are not normally distributed can pose a greater risk for rejecting a true model (Kline, 2010). However, maximum likelihood estimation is the most common estimation method in structural equation modeling and provides fairly robust estimates. Furthermore, simulation studies suggest that parameter estimates are fairly accurate even in non-normal data (Kline, 2010). Maximum likelihood estimation was used for initial model testing in this study.

Confirmatory factor analysis (CFA) was used to examine the factor structure of each of the survey scales used for the proposed path analyses in this study (see Appendix C for additional figures depicting the preliminary CFAs). Four indices of model fit were examined to evaluate the fit of all models analyzed in LISREL, including the chi-square test, root mean square error of approximation (RMSEA), comparative fit index (CFI), and standardized root mean square residual (SRMR). A non-significant chi-square result suggests excellent model fit; however, this test is known to be overly sensitive to large sample sizes (Kline, 2010). RMSEA values below .10 or .05 suggest reasonable to excellent fit. CFI values above .95 and SRMR values below .08 were also used as indicators of a well-fitting model. A model was considered to fit the data when at least two of the model fit indices suggested favorable model fit (Hu & Bentler, 1999).

Identity

Athletic Identity Measurement Scale (AIMS). The CFA for the original 10-item one-factor AIMS (Brewer, Van Raalte, & Linder, 1993) did not demonstrate good model fit, χ^2 (35)=222.18, RMSEA=0.14, (90% confidence interval= 0.12 - 0.16), CFI=0.91, SRMR=0.08. The revised 7-item AIMS (Brewer et al., 2001) including three first order factors (social identity, exclusivity, and negative affectivity) which load on a second-order latent factor (athletic identity) fit the data well, χ^2 (11)=35.98, p<.05, RMSEA=0.09 (90% confidence interval: 0.06 - 0.12), CFI=0.98, SRMR=0.04. The excellent fit of the hierarchical structure suggested by the CFI and SRMR statistics combined with good internal consistency of the measure indicate that a total AIMS score calculated from the seven items could be used for subsequent path analyses.

Exercise Identity Scale (EIS). Confirmatory factor analysis of the EIS revealed that the one-factor model originally proposed by Anderson and Cychosz (1994) fit significantly worse than the revised 2-factor model proposed by Wilson and Muon (2008), χ_D^2 (1)=100.89-82.88= 18.01, p<.05. These results question the univariate structure of the EIS. However, the correlation between the two latent factors of "identity" and "beliefs" (Wilson & Muon, 2008) was .93, which suggests they may essentially be measuring the same construct. In reviewing modification indices of the one-factor model, there was evidence that allowing two of the item indicators to correlate would improve model fit. Typically indicators are not predicted to covary within the model as their shared variance is expected to be explained by the latent factor. However, allowing these two indicators (i.e., *Exercise is a central factor to my self-concept* and *I*

need to exercise to feel good about myself) to covary substantially enhanced model fit. The relationship among the indicators beyond what is explained by the exercise identity latent factor may be due to the wording of the questions which seem to convey very similar meanings. This revised one-factor CFA demonstrated excellent fit, $\chi^2(26)= 70.94$, $p<.05$, RMSEA= 0.08 (90% Confidence Interval: 0.06 - 0.10), CFI= 0.99, SRMR= 0.03, and fit the data as well as, or even more favorably than, the 2-factor model, $\chi^2(26)=82.88$, $p<.05$, RMSEA=.09 (90% Confidence Interval: 0.07- 0.11), CFI= .98, SRMR=.04. These results combined with the high reliability of the 9-item measure and the very high correlation between the two latent factors proposed in the two-factor model support the use of a total score for the EIS in subsequent path analyses.

The total scores for the AIMS and the EIS were significantly correlated ($r(279)= .41$, $p<.05$), but their level of association suggests that they are not measuring the same construct. Thus, the independent effects of exercise identity and athletic identity were examined in the subsequent path analyses.

Motivation

Confirmatory factor analysis was used to examine the factor structure of the six motivation subscales (i.e., amotivation, external, introjected, identified, integrated, intrinsic). Evaluation of the fit indices suggested that the six first-order factor model for motivation fit the data well, $\chi^2(215)=502.68$, $p<.05$; RMSEA=0.07 (90% confidence interval: 0.06 - 0.08); CFI=0.97, SRMR=0.07. For the most part, the pattern of correlations among the subscales was consistent with SDT's motivation continuum where each type of behavioral regulation should be most highly correlated with the next closest

subscale(s) on the continuum. The observed correlations disattenuated for imperfect reliability (see Table 3, Methods) closely followed the expected simplex pattern.

Observed correlations, means, and standard deviations for all of the survey measures included in the path analyses that follow are depicted in Table 6.

Table 6

Observed Correlations and Standard Deviations

Variable	1	2	3	4	5	6	7	8	9
1. AI	1.00								
2. EI	.41**	1.00							
3. Intri	.20**	.57**	1.00						
4. Integ	.30**	.79**	.64**	1.00					
5. Ident	.18**	.73**	.68**	.75**	1.00				
6. Introj	.25**	.43**	.12	.42**	.38**	1.00			
7. Ext	.05	-.16**	-.35**	-.17**	-.27**	.19**	1.00		
8. Amot	.01	-.33**	-.27**	-.26**	-.37**	-.14*	.32**	1.00	
9. PA	.33**	.51**	.40**	.44**	.47**	.16**	-.16**	-.24**	1.00
M	31.49	45.31	4.10	3.70	4.28	3.21	1.59	1.13	43.36
SD	8.81	12.02	0.80	1.05	0.68	1.07	0.71	0.34	22.66

N=282 (*N*= 281 for Exercise Identity), *significant, p<.05, **significant, p<.01
Note: AI= athletic identity, EI= exercise identity, Intri= intrinsic, Integ= integrated, Ident= identified, ext= external, amot= amotivation, PA=physical activity

Main Results

Research Question 1

The first research question examined the relationships among exercise identity, motivation, and physical activity. Prior to analyzing the full model, an initial path analysis was used to analyze the relationships among the six motivation subscales and physical activity (See Appendix C). This saturated model fit the data perfectly. Identified, integrated, and intrinsic forms of motivation were highly correlated with each

other, suggesting multicollinearity. An examination of parameter estimates indicated that only the integrated and identified subscales significantly predicted physical activity participation; amotivation, external regulation, introjected regulation, and instrinsic regulation did not significantly predict physical activity. See Table 7 for parameter estimates, significance, and standardized path coefficients. The model explained 25% of the variance in physical activity levels.

Table 7

Maximum Likelihood Parameter Estimates for Motivation Type Predicting Physical Activity

Parameter	Unstandardized	SE	Standardized
	Direct effects		
AMOT→PA	-5.06 *(ns)*	3.84	-0.08
EXT→PA	0.06 *(ns)*	1.93	0.00
INTRO→PA	-.93 *(ns)*	1.32	-0.04
IDENT→PA	8.97	2.99	0.27
INTEG→PA	4.04	1.84	0.19
INTRI→PA	2.21 *(ns)*	2.20	0.08
	Variances and Covariances		
AMOT	0.12	0.01	1.00
EXT	0.50	0.04	1.00
INTRO	1.15	0.10	1.00
IDENT	0.47	0.04	1.00
INTEG	1.11	0.09	1.00
INTRI	0.63	0.05	1.00
AMOT◡EXT	0.08	0.02	0.32
AMOT◡INTRO	-0.05	0.02	-0.14
AMOT◡IDENT	-0.09	0.02	-0.37
AMOT◡INTEG	-0.09	0.02	-0.26
AMOT◡INTRI	-0.07	0.02	-0.27
EXT◡INTRO	0.14	0.05	0.19
EXT◡IDENT	-0.13	0.03	-0.27
EXT◡INTEG	-0.13	0.05	-0.17
EXT◡INTRI	-0.20	0.04	-0.35

INTRO◡IDENT	0.28	0.05	0.38
INTRO◡INTEG	0.47	0.07	0.42
INTRO◡INTRI	0.10 *(ns)*	0.05	0.12
IDENT◡INTEG	0.54	0.05	0.75
IDENT◡INTRI	0.37	0.04	0.68
INTEG◡INTRI	0.53	0.06	0.64
D_{PA}	383.88	32.62	0.75

Note: AMOT= amotivation, EXT= external, INTRO= introjected, IDENT= identified, INTEG=integrated, INTRI= intrinsic, PA= physical activity. All estimates are significant at the .05 level unless designated *ns*. Standardized estimates for disturbance variances are proportions of unexplained variance.

The full exercise identity model was then examined. The proposed model (see Appendix C) did not fit the data well, $\chi^2(14)=230.72$, $p<.01$, RMSEA=0.24 (90% Confidence Interval: 0.21 - 0.26), CFI= 0.85 SRMR= 0.10. Examination of modification indices and standardized residuals suggested that allowing the endogenous motivation variables (i.e., introjected, identified, integrated, intrinsic) to covary would improve model fit. Other factors can reasonably influence motivation besides identity, so allowing the motivation subscales to covary is defensible.

The CFI and SRMR values suggested good to excellent fit for the revised model $\chi^2(8)=65.82$, $p<.01$, RMSEA=.16, (90% Confidence Interval: 0.13 - 0.20); CFI=.96, SRMR=.07. The chi-square test is overly sensitive to sample size and RMSEA privileges parsimony, so having only eight degrees of freedom may have contributed to the larger RMSEA value. Though fit was not perfect, the model was deemed acceptable given the corroboration of both the CFI and SRMR values for the specified model (Hu & Bentler, 1999). When referring to individual parameter estimates, all standardized path coefficients in the model will subsequently be referred to as β. In this model (see Figure 8), exercise identity directly and significantly predicted physical activity participation as

expected in the first hypothesis. Exercise identity also significantly predicted the introjected, indentified, integrated, and intrinsic motivation subscales, which supports the second hypothesis. In testing the third hypothesis, only the identified motivation subscale significantly predicted physical activity participation. The indirect effect of exercise identity on physical activity did not quite reach significance within the model; however, the total effect of exercise identity on physical activity (β= .50), which is greater than its direct effect alone (β= .37), was significant, providing some evidence of partial mediation as suggested in the fourth hypothesis. See Table 8 for individual parameter estimates and their significance. Overall, the model explained 30% of the variance in reported physical activity levels. The model also explained a substantial amount of variance in integrated and identified regulation. See Table 9 for squared multiple correlations from the model.

Figure 8

Exercise Identity, Motivation, and Physical Activity Standardized Path Diagram

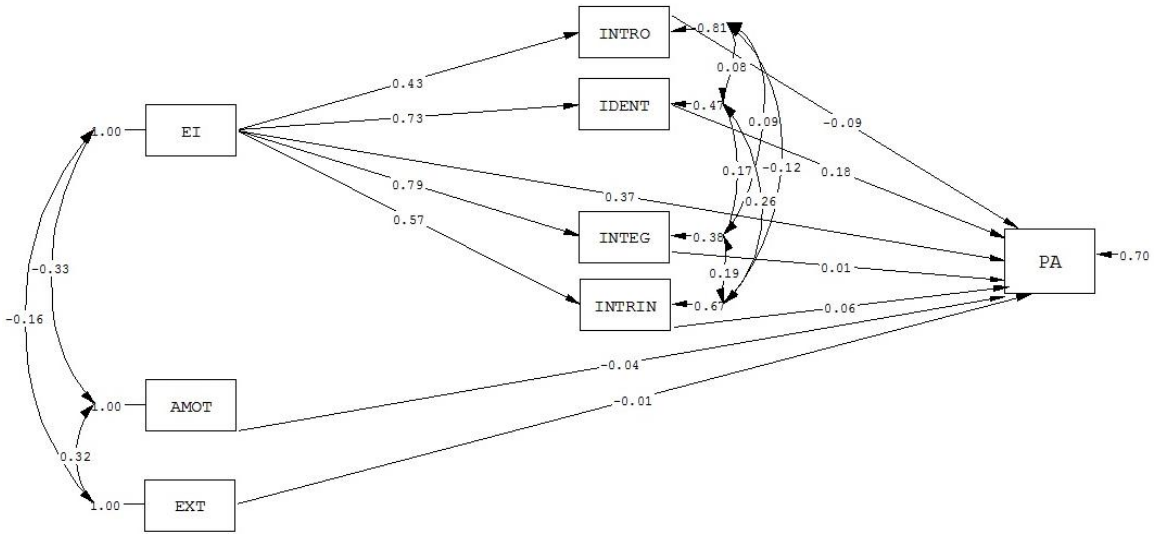


Table 8

Maximum Likelihood Parameter Estimates for Exercise Identity, Motivation, and Physical Activity Model

Parameter	Unstandardized	SE	Standardized
	Direct effects		
EI→INTRI	0.04	0.00	0.57
EI→INTEG	0.07	0.00	0.79
EI→IDENT	0.04	0.00	0.73
EI→INTRO	0.04	0.01	0.43
EI→PA	0.69	0.17	0.37
EXT→PA	-0.20 *(ns)*	1.70	-0.01
AMOT→PA	-2.94 *(ns)*	3.68	-0.04
INTRI→PA	1.58 *(ns*)	2.11	0.06
INTEG→PA	0.15 *(ns)*	2.02	0.01
IDENT→PA	6.01	2.90	0.18
INTRO→PA	-1.81 *(ns)*	1.26	-0.09
	Indirect effects		
EI→PA	0.25 *(ns)*	0.14	0.13
	Variances and Covariances		
EI	144.58	12.24	1.00
AMOT	0.12	0.01	1.00
EXT	0.50	0.04	1.00
EI◡AMOT	-1.38	0.26	-0.33
EI◡EXT	-1.34	0.52	-0.16
AMOT◡EXT	0.08	0.02	0.32
INTRO◡IDENT	0.06	0.03	0.08
INTRO◡INTEG	0.10	0.04	0.09
INTRO◡INTRI	-0.10	0.04	-0.12
IDENT◡INTEG	0.12	0.02	0.17
IDENT◡INTRI	0.14	0.02	0.26
INTEG◡INTRI	0.16	0.03	0.19
D_{intro}	0.93	0.08	0.81
D_{ident}	0.22	0.02	0.47
D_{integ}	0.42	0.04	0.38
D_{intri}	0.42	0.04	0.67
D_{PA}	362.10	30.67	0.70

Note: EI= exercise identity, AMOT= amotivation, EXT= external, INTRO= introjected, IDENT= identified, INTEG=integrated, INTRI= intrinsic, PA= physical activity. All estimates are significant at the .05 level unless designated *ns*. Standardized estimates for disturbance variances are proportions of unexplained variance.

Table 9

Variance Explained by the Exercise Identity, Motivation, and Physical Activity Model

	INTRO	IDENT	INTEG	INTRI	PA
R^2	0.19	.53	.62	.33	.30

Research Question 2

The second research question examined the relationships among athletic identity, motivation, and physical activity participation. The original proposed athletic identity-motivation-physical activity model (see Methods section, Figure 6) did not fit the data well, $\chi^2(14)=575.31$, $p<.01$, RMSEA= 0.38 (90% Confidence Interval: 0.35 - 0.40), CFI= 0.40, SRMR= 0.25. Even after allowing the endogenous motivation variables to covary as in the revised exercise identity model presented for the first research question, model fit was still poor, $\chi^2(8)= 97.43$, $p<.01$, RMSEA= 0.20 (90% Confidence Interval: 0.17 - 0.24), CFI= 0.90, SRMR= 0.13. (See Appendix C for figures depicting these initial models). Modification indices suggested that allowing all of the motivation variables to covary with one another, including amotivation and external regulation now as endogenous variables, would improve model fit (see Figure 9). The resulting saturated model fit the data perfectly. In examining the fifth and sixth proposed hypotheses, athletic identity was most related to integrated and introjected forms of motivation and had a small direct effect on physical activity participation ($\beta= .26$, $p<.05$), though its total effect on physical activity when including its indirect effects through motivation was slightly larger ($\beta= .33$, $p<.05$). See Table 10 for parameter estimates, significance, and standardized path coefficients. Removing the direct effect of athletic identity on physical

activity significantly worsened the model fit, $\chi_D^2(1) = 22.38$, $p<.05$. Thus, in examining the seventh hypothesis, the athletic identity - physical activity relationship appears to be only partially mediated by motivation. Approximately 31% of the variance in physical activity was explained by the model.

Figure 9

Athletic Identity, Motivation, and Physical Activity Standardized Path Diagram

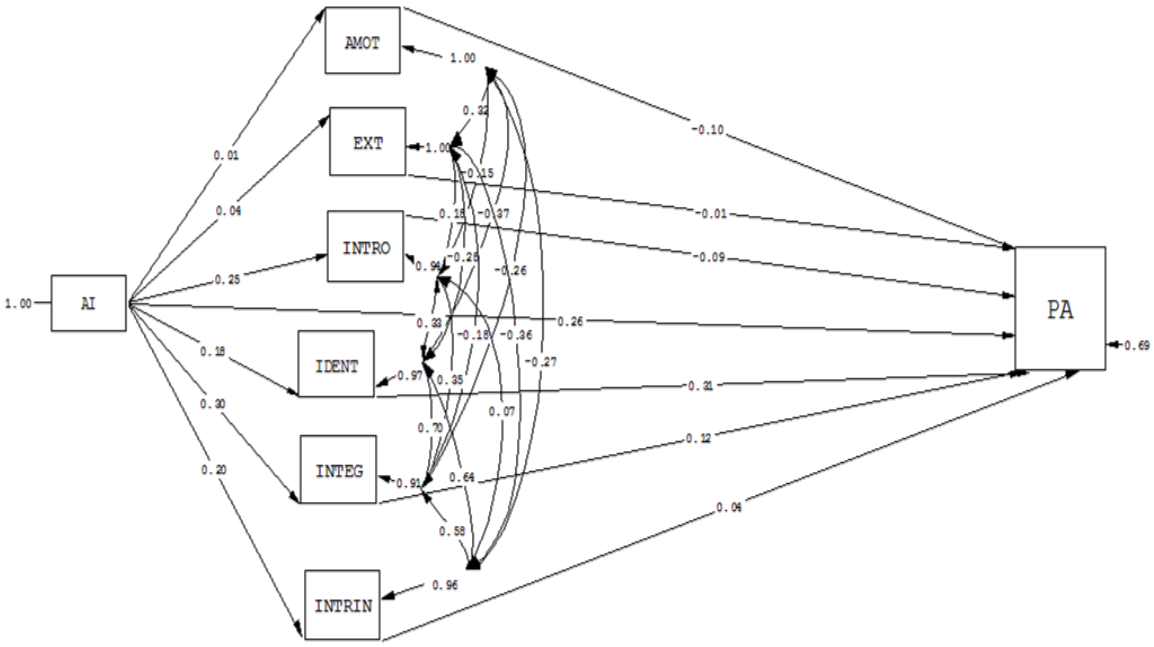


Table 10

Maximum Likelihood Parameter Estimates for Athletic Identity, Motivation, and Physical Activity Model

Parameter	Unstandardized	SE	Standardized
	Direct effects		
AI→INTRI	0.02	0.01	0.20
AI→INTEG	0.04	0.01	0.30
AI→IDENT	0.01	0.01	0.18
AI→INTRO	0.03	0.01	0.25
AI→EXT	0.00 *(ns)*	0.01	0.05
AI→AMOT	0.00 *(ns)*	0.00	0.01
AI→PA	0.66	0.14	0.26
INTRI→PA	1.17 *(ns)*	2.12	0.04
INTEG→PA	2.58 *(ns)*	1.78	0.12
IDENT→PA	10.20	2.86	0.31
INTRO→PA	-1.88 *(ns)*	1.27	-0.09
EXT→PA	-0.31 *(ns)*	1.84	-0.01
AMOT→PA	-6.30 *(ns)*	3.70	-0.10
	Indirect effects		
AI→PA	0.19	0.08	0.08
	Variances and Covariances		
AI	77.74	6.54	1.00
AMOT◡EXT	0.08	0.02	0.32
AMOT◡INTRO	-0.05	0.02	-0.15
AMOT◡IDENT	-0.09	0.02	-0.37
AMOT◡INTEG	-0.10	0.02	-0.26
AMOT◡INTRI	-0.07	0.02	-0.27
EXT◡INTRO	0.14	0.04	-0.18
EXT◡IDENT	-0.13	0.03	-0.28
EXT◡INTEG	-0.14	0.04	-0.18
EXT◡INTRI	-0.20	0.04	-0.36
INTRO◡IDENT	0.25	0.04	0.33
INTRO◡INTEG	0.39	0.07	0.35
INTRO◡INTRI	0.06 *(ns)*	0.05	0.07
IDENT◡INTEG	0.50	0.05	0.70
IDENT◡INTRI	0.35	0.04	0.64
INTEG◡INTRI	0.49	0.01	0.58
D_{amot}	0.12	0.01	1.00
D_{ext}	0.50	0.04	1.00

D_{intro}	1.08	0.10	0.94
D_{ident}	0.45	0.04	0.97
D_{integ}	1.01	0.09	0.91
D_{intri}	0.60	0.05	0.96
D_{PA}	354.60	29.86	0.69

Note: AI= athletic identity, AMOT= amotivation, EXT= external, INTRO= introjected, IDENT= identified, INTEG=integrated, INTRI= intrinsic, PA= physical activity. All estimates are significant at the .05 level unless designated *ns*. Standardized estimates for disturbance variances are proportions of unexplained variance.

Research Question 3

Because a well-fitting unsaturated model consistent with the exercise identity-motivation-physical activity model could not be established for the athletic identity-motivation-physical activity relationships, the full exercise identity and athletic identity models were not combined as originally proposed. However, in both models, the identity variables had significant independent effects on physical activity. Thus, to investigate an exploratory moderation model, the combined direct effects of athletic identity and exercise identity in predicting physical activity were examined. In this saturated model (see Figure 10), athletic identity, exercise identity, and a centered product interaction term significantly predicted physical activity. In the moderation model, exercise identity had the largest path coefficient and demonstrated a stronger relationship to physical activity than athletic identity. The interaction term was positive and significant, suggesting that the relationship between athletic identity and physical activity is stronger for individuals who also have higher exercise identity. See Table 11 for parameter estimates, significance, and standardized path coefficients. The model explained almost 30% of the variance in physical activity. Removing the interaction path from the model significantly worsened model fit, $\chi^2_D(1)=5.71$, $p<.05$, suggesting that there was a small but significant moderation effect as outlined in the eighth hypothesis.

Table 11

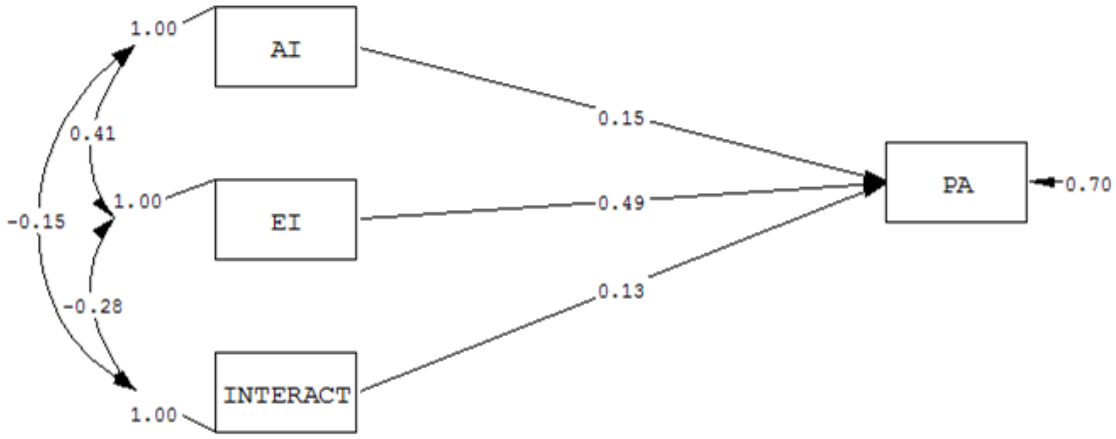
Maximum Likelihood Parameter Estimates for the Combined Effects of Exercise Identity and Athletic Identity in Predicting Physical Activity

Parameter	Unstandardized	SE	Standardized
	Direct effects		
EI→PA	0.92	0.11	0.49
AI→PA	0.39	0.14	0.15
EI*AI→PA	0.02	0.01	0.13
	Variances and Covariances		
EI	144.58	12.24	1.00
AI	77.52	6.56	1.00
EI*AI	16028.24	1357.08	1.00
EI◡AI	43.67	6.86	0.41
EI◡EI*AI	-420.08	94.54	-0.28
AI◡EI*AI	-171.77	67.52	-0.15
D_{PA}	362.70	30.71	0.70

Note: EI= exercise identity, AI= athletic identity, EI*AI= centered product term representing the interaction between athletic identity and exercise identity, PA= physical activity. All estimates are significant at the .05 level. Standardized estimates for disturbance variances are proportions of unexplained variance.

Figure 10

Combined Exercise Identity, Athletic Identity, and Physical Activity Standardized Path Diagram



CHAPTER V

DISCUSSION

The purpose of this study was to examine physical activity participation among former college athletes using an identity and self-determined motivation framework. The independent and combined effects of exercise identity and athletic identity in predicting self-determined motivation for physical activity and participation in physical activity were examined through path analyses. First, a model of exercise identity, motivation, and physical activity participation was tested with the sample of former college athletes. Then, a similar model was examined for athletic identity, motivation, and physical activity. Finally, the combined influence of exercise identity and athletic identity in predicting physical activity was determined.

The first research question examined the extent to which exercise identity predicted self-determined motivation and physical activity participation in former college athletes. The variables were expected to relate as follows: a) higher exercise identity is related to higher physical activity participation; b) higher exercise identity is related to intrinsic, integrated, identified, and introjected types of motivation; c) higher levels of self-determined forms of motivation are related to participation in more physical activity; and d) the effect of exercise identity in predicting physical activity participation is mediated by self-determined motivation.

Examination of individual path coefficients within the exercise identity-motivation-physical activity model suggests that exercise identity does significantly predict physical activity, which supports the first hypothesis. Exercise identity also significantly predicted more self-determined forms of motivation, which supports the second hypothesis. The squared multiple correlations derived from the path model show that exercise identity explained 53% of the variance in identified regulation and 62% of the variance in integrated regulation. Identified regulation refers to individuals being motivated to exercise because it is in line with their self-identified goals and values. Integrated regulation describes an individual who is motivated to exercise because it is part of who they are. Both of these more self-determined forms of behavioral regulation represent an internalization of exercise behavior as central to the self. Thus, exercise identity logically explains a substantial portion of their variance in this model.

Consistent with the third hypothesis, the motivation subscales were significantly related to physical activity. The observed correlations follow the hypothesized directions in which intrinsic, integrated, identified, and introjected regulation were positively related to physical activity while external regulation and amotivation were negatively related to physical activity. However, these patterns of relationships did not hold when the relationships of the motivation variables to physical activity were considered simultaneously. The identified, integrated, and intrinsic subscales in particular were highly correlated, which was even more evident among the disattenuated correlations. The discriminant validity among the BREQ-2 subscales should be considered further in future research. In any case, the high collinearity among the identified, integrated, and

intrinsic motivation subscales prevented a single subscale from emerging as a powerful predictor of physical activity in the path analysis. Though each had a clear observed correlation with physical activity, their predictive relationships with physical activity when accounting for the effect of each other were small. In effect, the motivation factors are "stealing" explanatory power from each other. Of the motivation measures included in the model, only identified regulation significantly predicted physical activity.

Interestingly, the path loading for integrated regulation predicting physical activity was essentially zero, which contradicts the subscale validation research by McLachlan and colleagues (2011), who found that integrated regulation was an independent predictor of physical activity. However, the zero relationship finding in the current model is likely a reflection of the model simultaneously controlling for the effect of exercise identity on physical activity. Integrated regulation (i.e., exercising because it is integrated with self-identity) is highly related to exercise identity and thus does not have an additional influence on physical activity after controlling for exercise identity. In fact, in the model depicting only the relationships between the motivation subscales and physical activity participation and excluding exercise identity, both the identified and integrated subscales emerged as significant independent predictors. In past research by Edmunds, Ntoumani, and Duda (2006), identified regulation also emerged as a significant predictor while intrinsic motivation did not make an independent contribution. For many people, exercise itself is not always intrinsically motivating (Ryan, Williams, & Deci, 2009), but valuing physical activity and viewing it as essential to personal goals likely motivates many adults to participate.

The fourth hypothesis regarding the mediating role of motivation in the exercise identity and physical activity relationship was partially supported. Although the indirect effect of exercise identity on physical activity did not quite reach significance within the model, the total effect of exercise identity on physical activity (β= .50), which is greater than its direct effect alone (β=.37), was significant, which suggests there is some mediation occurring. However, exercise identity had the largest direct effect on physical activity in the model, and the path was statistically significant. While exercise identity may be partly mediated by motivation, identity still has an independent effect on physical activity. Together, exercise identity and motivation explained 30% of the variance in physical activity. Physical activity is complex and affected by numerous factors, so having almost a third of the variance in reported physical activity levels explained by exercise identity and motivation in this model is significant in a practical sense. As other researchers have suggested, these findings support the fostering of exercise identity and self-determined motivation in interventions that promote physical activity (Anderson, Anderson, Cychosz, & Franke, 2001; Strachan et al., 2012; Strachan & Whaley, 2013; Wilson & Muon, 2008).

The second research question examined the extent to which athletic identity predicts self-determined motivation and physical activity participation in former college athletes. The expected relationship among the variables were as follows: a) higher athletic identity is related to greater participation in physical activity, b) higher athletic identity is related to higher intrinsic, integrated, identified, and introjected regulation, and c) the effect of athletic identity in predicting physical activity participation is mediated by

self-determined motivation. Other than the fully saturated model, a well-fitting model for the athletic identity-motivation-physical activity relationship was not found based on the model proposed for this study. A better fitting athletic identity-motivation-physical activity model may be possible if non-significant predictors are excluded in future models. However, the saturated model suggested that athletic identity was most closely related to integrated regulation and had a moderately positive relationship with physical activity levels. Despite some mediation through motivation, athletic identity had a significant independent effect on physical activity. However, athletic identity was not as highly correlated with motivation or physical activity compared to exercise identity's relationship with these variables. The observed correlations between athletic identity and physical activity (r= .33) and exercise identity and physical activity (r= .51) in the current sample of former college athletes closely replicate the findings from Reifsteck's (2011) preliminary research that demonstrated a moderate relationship between the sports-specific athletic identity (AIMS, r= .36) and physical activity and a stronger relationship between the more broadly defined athletic identity (AIQ, r= .53) in former college athletes. Evidence thus far suggests that these identity-physical activity relationships seem to manifest consistently in the former college athlete population.

To follow up on this comparison of the effects of athletic identity and exercise identity on physical activity, a moderation model was examined to answer the third research question, which examined the combination of athletic identity and exercise identity in predicting physical activity. Exercise identity and athletic identity both had independent effects on physical activity in the individual models for the first two research

questions. Motivation was not included in the third exploratory model because of the inability to find a well-fitting motivation and activity model for athletic identity. The moderation model further demonstrated that when their individual effects are considered together, exercise identity (β=.49) was a stronger predictor of physical activity compared to athletic identity (β=.15). The model also supported the hypothesis that exercise identity moderated the relationship between athletic identity and physical activity such that the relationship was stronger for individuals with higher athletic identity who also had higher exercise identity.

Athletic identity, which is rooted more specifically in competitive sport, is often the primary source of self-identity for competitive athletes (Brewer et al., 1993). Athletic identity may be related to participation in competitive sport training, but as the findings in this study suggest, athletic identity is not a strong predictor of more general physical activity participation. While other researchers have recommended that athletes disengage from their athletic identity after retiring from their competitive sport careers in order to avoid an identity crisis (Lavallee, Gordon, & Grove, 1997; Lally & Kerry, 2007), completely abandoning an active-based identity like athletic identity is likely not beneficial to promoting sustained involvement in sport, exercise, and physical activity. Instead, sport career exit programs should focus on helping athletes transition from a narrow, sport-specific athletic identity to a broader exercise identity. Indeed, exercise identity was the strongest independent predictor of physical activity in the current sample of former college athletes. Thus, fostering a broader exercise identity may be key to promoting lifelong physical activity after retirement from competitive sport.

Practical Implications

While the majority of the current sample of former college athletes surveyed in this study self-reported regular physical activity participation, 10% of the sample was classified as insufficiently active for health benefits according to Godin's (2011) cut-off score of less than 14 units of physical activity, and almost a quarter of the sample reported that they had been sedentary within the past six months. These findings paint a slightly more optimistic picture than the findings from Reifsteck, Gill, and Brooks' (2013) study which found that almost a third of former Division I athletes reported sedentary behavior within the past six months. In both cases, a significant portion of the sample reported some amount of sedentary behavior that might put these former athletes at an increased risk for health concerns (Witkowski & Spangenburg, 2008). Furthermore, Brenner and DeLamater (2013) found that people often over-report their activity levels when measured through direct self-report surveys, so the portion of former student-athletes at risk for inactivity-related health issues may actually be higher.

Generally, people are less motivated to participate in exercise compared to sport (Ryan et al., 2009). This is especially likely to be an issue for competitive athletes who transition out of competitive sport and lose many motivators to be active (e.g., scholarships, coaches, teammates). Stephan and colleagues (2003a; 2003b) argued that implementing transitional programs might prevent an abrupt change in physical activity that could threaten a transitioning athlete's identity, self-worth, and long-term health. For student-athletes transitioning to life after college, future programs should be developed that integrate the tenets of identity theory and self-determination theory and related

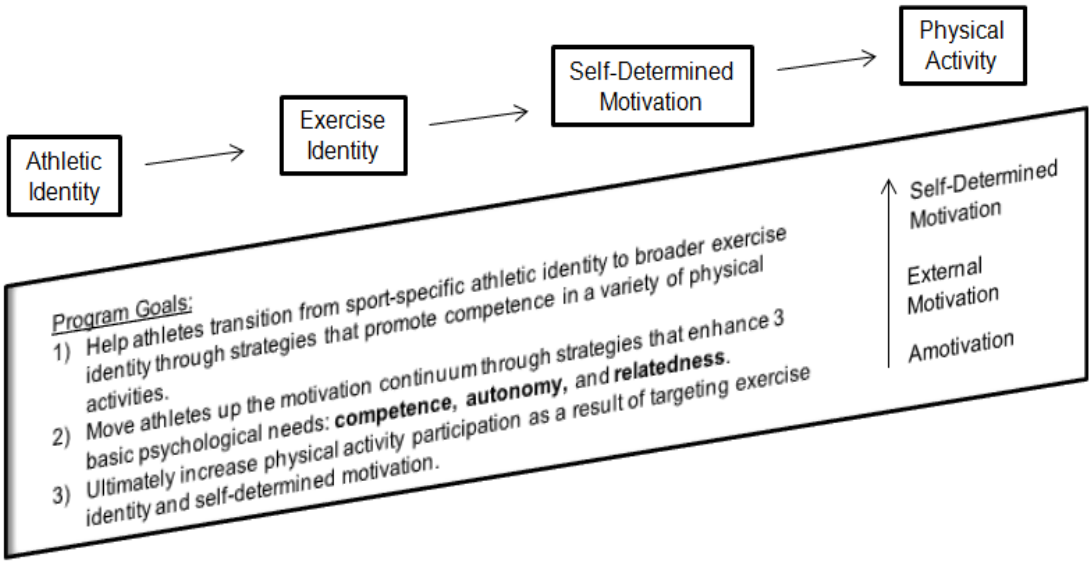
cognitive-behavioral strategies to promote physical activity among transitioning college athletes.

As *identity theory* proposes, individuals engage in behaviors that validate their respective identities (Burke et al., 2003; Burke & Reitzes, 1981). When sport, exercise, and physical activity are central to a person's self-identity, individuals are more likely to engage in those activities (Brewer et al., 1993; Kendzierski & Morganstein, 2009; Reifsteck et al., 2013, Strachan et al., 2005). Similarly, self-determination theory (Deci & Ryan, 1985; Ryan et al., 2009) posits that people are more likely to maintain a behavior that has been internalized and integrated with the self. Fulfilling the basic psychological needs of autonomy, competence, and relatedness can move individuals up the motivation continuum toward more self-determined motivation (Edmunds et al., 2006). Thus, transitional programs should focus on helping student-athletes transition from a sport-specific identity to a broader exercise identity and also include cognitive-behavioral strategies that enhance self-determined motivation for physical activity. Effective programs might include an overview of physical activity benefits and risks, federal recommendations for physical activity, effective goal setting, and planning for the transition out of college and staying physically active. Physical activities could be directly built in to programs to provide active experiences with varied lifetime physical activities. Activity sessions should include choice and skill development to promote autonomy and competence, and incorporate group activities to foster relatedness with others. Development of these physical activity transition programs in the future can ultimately help the more than 400,000 NCAA student-athletes who compete each year

plan for lifetime physical activity after college and transition into healthy lifestyles after completing their sport careers (see Figure 11).

Figure 11

Conceptual Model of a Physical Activity Transition Program for College Athletes



Limitations

A primary limitation in this study was the reliance on maximum likelihood estimation in the analysis of the data. Pre-screening of the data suggested some violation to the assumption of multivariate normality. Though individual parameter estimates are often consistently estimated under non-normal conditions, estimates of model fit and significance tests can result in an incorrect rejection of the model due to an inflated chi-square value (Kline, 2010). A formal statistical correction such as the Satorra-Bentler correction (Satorra & Bentler, 1994) might provide a more accurate estimate of the model fit and the significance of parameter estimates. In the Satorra-Bentler correction, the

standard chi-square value is divided by a scaling factor based on the amount of skew and kurtosis, which usually results in a more favorable model fit when data is not multivariate normal. Follow-up analyses using this formal correction should be examined and compared with the models presented in this study.

The self-report nature of the physical activity assessment is also a limitation in this study, as self-report measures of physical activity are notoriously inconsistent in their relationship to actual physical activity participation (Prince et al., 2008). The Godin LTEQ also focuses primarily on aerobic types of activity and may not adequately reflect resistance training activities and related health benefits.

Additionally, the former college athlete population is a challenging group to recruit and study, and this research relied upon the availability of contact information from participating athletic departments. The range of identity, motivation, and activity behaviors is limited by the participants included in this sample. This sample is not representative of all college athletes, and White/Caucasian individuals were disproportionately represented in the sample. Additionally, respondents to the survey may have actually been more likely to participate in the study in the first place because of their identity or motivation pertaining to physical activity. Future research should replicate the proposed models and findings from this study with a larger group of former college athletes from diverse backgrounds and collegiate institutions.

Another general limitation of the research relates to accurately characterizing the identity-physical activity relationship. Brenner and DeLamater (2013) recently showed that exercise identity importance can actually influence estimation of physical activity

participation. Precisely because exercise is important to them, participants with salient exercise identity may be motivated to present themselves in a way that is consistent with their identity, thus potentially leading to over-reporting their physical activity behavior. Distinguishing between exercise identity and physical activity participation versus exercise identity and the report of physical activity is challenging. Future research should attempt to use multiple sources of physical activity information, and include both objective and subjective measures if possible. However, the current study replicated identity and physical activity relationships found previously (Reifsteck, 2011; Reifsteck, Gill, & Brooks, 2013). Based on evidence from the present study and the growing body of literature on the topic, identity appears to be a consistent predictor of physical activity participation in both the former college athlete group and the general population.

Conclusion

There are many established benefits to physical activity (American College of Sports Medicine, 2013), and maintaining activity across the lifespan is essential for everyone, and especially important for former athletes (Witkowksi & Spangenburg, 2008). Promoting physical activity among all Americans is a central goal of the federal government (Department of Health and Human Services, 2013). However, major efforts thus far have served to better understand and increase physical activity engagement among members of the general population. Athletes are a special population, and evidence shows that they may have unique challenges in maintaining long-term physical activity after college. Many student-athletes experience a clear drop in their physical activity participation after college (Reifsteck, Gill, & Brooks, 2013), and some former

athletes do not maintain regular physical activity patterns. Changes in physical activity participation are complex and likely related to numerous individual and environmental factors. The results of this study further underscore the relevance of identity and self-determination theories in understanding and promoting physical activity and suggest that self-determined motivation and exercise identity in particular play important roles in promoting physical activity participation in former college athletes. These findings provide promising directions for the integration of identity and self-determination theories, which has gained recent attention in research on physical activity behaviors in the general population (Springer, Lamborn, & Pollard, 2013; Strachan et al., 2012). Development of physical activity transition programs for college athletes using a combined identity and self-determination theory framework is recommended. Ultimately, translating the theory and research related to identity, motivation, and physical activity into practical programs can have a profound impact on current and future student-athletes as they transition to life after college sports.

REFERENCES

American College of Sports Medicine (2013). *ACSM's guidelines for exercise testing and prescription (9th Ed.)*. Wolters Kluwer/Lippincott Williams & Wilkins Health: Baltimore, MD.

Anderson, D.F. & Cychosz, C.M. (1994). Development of an exercise identity scale. *Perceptual and Motor Skills, 78*, 747-751.

Anderson, D.F., Cychosz, C.M., & Franke, W.D. (2001). Preliminary exercise identity scale (EIS) norms for three adult samples. *Journal of Sport Behavior, 24*(1), 1-9.

Anderson, C.B. (2004). Athletic identity and its relation to exercise behavior: Scale development and initial validation. *Journal of Sport and Exercise Psychology, 26*, 39-56.

Backmand, H., Kujala, U. Sarna, S., & Kaprio, J. (2010). Former athletes' health-related lifestyle behaviours and self-rated health in late adulthood. *International Journal of Sports Medicine, 31*, 751-758. doi: 10.1055/s-0030-1255109

Barbeau, A., Sweet, S.H., & Fortier, M. (2009). A path-analytic model of Self-Determination Theory in a physical activity context. *Journal of Applied Biobehavioral Research*, 14(3), 103-118. doi: 10.1111/j.1751-9861.2009.00043.x

Brenner, P.S., & DeLamater, J.D. (2013). Social desirability bias in self-reports of physical activity: Is an exercise identity the culprit? *Social Indicators Research*, 06 2013 (No Pagination Specified). doi: 10.1007/s11205-013-0359-y

Brewer, B. W., & Cornelius, A. E. (2001). Norms and factorial invariance of the Athletic Identity Measurement Scale. *Academic Athletic Journal, 15*, 103–113.

Brewer, B.W., Cornelius, A.E., Stephan, Y., & Van Raalte, J. (2010). Self-protective changes in athletic identity following anterior cruciate ligament reconstruction**.** *Psychology of Sport and Exercise*, *11*(1), 1–5. doi: 10.1016/j.psychsport.2009.09.005

Brewer, B. W., Van Raalte, J. L., & Linder, D. E. (1993). Athletic identity: Hercules' muscles or Achilles heel? *International Journal of Sport Psychology, 24*, 237-254.

Burke, P.J., Owens, T.J., Serpe, R.T., & Thoits, P.A. (2003). *Advances in identity theory and research.* Kluwer Academic/Plenum Publishers: New York, NY.

Burke, P. T., & Reitzes, D. (1981). The link between identity and role performance. *Social Psychology Quarterly*, *44*, 83-92.

Burke, P.J. & Reitzes, D.C. (1991). An identity theory approach to commitment. *Social Psychology Quarterly, 54*(3), 239-251.

Callero, P. L. (1985). Role-identity salience. *Social Psychology Quarterly*, *48*(3), 203-215.

Cardinal, B. J. & Cardinal, M. K. (1997). Changes in exercise behaviour and exercise identity associated with a 14-week aerobic exercise class. *Journal of Sport Behavior, 20,* 377-386.

Caruso, C.M. & Gill, D.L. (1992). Strengthening physical self-perceptions through exercise. *Journal of Sports Medicine and Physical Fitness, 32*(4), 416-427.

Deci, E. L., & Ryan, R. M. (1985). *Intrinsic motivation and self-determination in human behavior***.** New York: Plenum.

Douglas, K., & Carless, D. (2009). Abandoning the performance narrative: Two women's stories of transition from professional sport. *Journal of Applied Sport Psychology*, *21,* 213-230. doi: 10.1080/10413200902795109

Edmunds, J., Ntoumani, N. & Duda, J. (2006). A test of Self-Determination Theory in exercise. *Journal of Applied Social Psychology, 36*(9), 2240–2265.

Estabrooks, P. & Courneya, K.S. (1997). Relationships among self-schema, intention, and exercise behavior. *Journal of Sport and Exercise Behavior, 19,* 156-168.

Fox, K.R. (2000). Self-esteem, self-perceptions and exercise. *International Journal of Sport Psychology, 31*(2), 228-240.

Fox, K.R. & Corbin, C.B. (1989). The physical self-perception profile: Development and validation. *Journal of Sport and Exercise Psychology*, *11*(4), 408-430.

Gill, J.M., Caslake, M.J., McAllister, C., Tsofliou, F., Ferrell, W.K., Packard, C.J., & Malkova, D. (2003). Effects of short-term detraining on postprandial metabolism, endothelial function, and inflammation in endurance-trained men: dissociation between changes in triglyceride metabolism and endothelial function. *Journal of Clinical Endocrinology and Metabolism, 88*(4), 328–335. doi: 10.1210/jc.2003-030226

Gill, D.L. & Williams, L. (2008). *Psychological dynamics of sport and exercise.* Champaign, IL: Human Kinetics.

Godin, G. (2011). The Godin Leisure-Time Physical Activity Questionnaire. *Health Fitness Journal of Canada, 4*(1), 18-22.

Godin, G., & Shepherd, R. J. (1985). A simple method to assess exercise behavior in the community. *Canadian Journal of Applied Sport Sciences, 10*, 141-146.

Harter, S. (1999). Developmental perspectives: Construction of the self. New York, NY: Guilford Press.

Hayes, S.D., Crocker, P.R., Kowalski, K.C. (1999). Gender differences in physical self-perceptions, global self-esteem and physical activity: Evaluation of the physical self-perception profile model. *Journal of Sport Behavior, 22*(1), 1-14.

Houle, J. L. W., Brewer, B. W., & Kluck, A. S. (2010). Developmental trends in athletic identity: A two-part retrospective study. *Journal of Sport Behavior, 33*, 146-159.

Hu, L., & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling, 6*, 1–55.

Jacobs, D. R., Jr., Ainsworth, B. E., Hartman, T. J., & Leon, A. S. (1993). A simultaneous evaluation of 10 commonly used physical activity questionnaires. *Medicine & Science in Sport & Exercise, 25*, 81-91.

Kendzierski, D. (1988).Self-schemata and exercise. *Basic and Applied Social Psychology*, *9*(1), 45-59.

Kendzierski, D. (1990). Exercise self-schemata: Cognitive and behavioral correlates. *Health Psychology*, *9*(1), 69-82.

Kendzierski, D., Furr, M.R., & Schiavoni, J. (1998). Physical activity self-definitions: Correlates and perceived criteria. *Journal of Sport and Exercise Psychology, 20*, 176-193.

Kendzierski, D. & Morganstein. (2009). Test, revision, and cross-validation of the physical activity self-definition model. *Journal of Sport and Exercise Psychology, 31*, 484-504.

Kline, R.B. (2010). *Principles and practice of structural equation modeling, 3rd Edition*. The Guilford Press: New York, NY.

Lally, P. (2007). Identity and athletic retirement: A prospective study. *Psychology of Sport and Exercise, 8*, 85-99. doi: 10.1016/j.psychsport.2006.03.003

Lally, P. S., & Kerr, G. A. (2005). The career planning, athletic identity, and student role identity of intercollegiate student-athletes. *Research Quarterly for Exercise and Sport, 76*, 275-285.

Lavallee, D., Gordon, S., & Grove, J.R. (1997). Retirement from sport and the loss of athletic identity. *Journal of Personal and Interpersonal Loss, 2*, 129-147. doi: 10.1080/10811449708414411

Liu, T.C., Lee S.D., Huang C.Y., Chien K.Y., Lin, C.Y., & Kuo, C.H. (2008). Effects of short-term detraining on obesity measures and glucose tolerance in elite athletes. *Journal of Sports Sciences, 26*(9), 19–25.

Lockhart, B. D. (2010). Injured Athletes' Perceived Loss of Identity: Educational Implications for Athletic Trainers. *The Athletic Training Education Journal*, *5*(1):26-31.

Manuel, J. C., Shilt, J. S., Curl, W. W., Smith, J. A., Durant, R. H., Lester, L., & Sinal, S. H. (2002). Coping with sports injuries: an examination of the adolescent athlete. *Journal of adolescent health*, *31*(5), 391-393.

Marcus, B.H., Selby, V.C., Niaura, R.S., & Rossi, J.S. (1992). Self-efficacy and the stages of exercise behavior change. *Research Quarterly for Exercise and Sport, 63*(1), 60-66.

Markland, D. & Tobin, V. (2004). A modification to the Behavioural Regulation in Exercise Questionnaire to include an assessment of amotivation. *Journal of Sport and Exercise Psychology, 26*, 191-196.

Markus, H. (1977). Self-schemata and processing information about the self. *Journal of Personality and Social Psychology, 35*(2), 63-78. doi: 10.1037/0022-3514.35.2.63

Marsh, H.W. (1993). Relations between global and specific domains of self: The importance of individual importance, certainty, and ideals. *Journal of Personality and Social Psychology, 65*(5), 975-992. doi: 10.1037/0022-3514.65.5.975

Marsh, H.W. (1990). A multidimensional, hierarchical model of self-concept: Theoretical and empirical justification. *Educational Psychology Review, 2*(2), 77-172.

Marsh, H. W. (1986). Global self-esteem: Its relation to specific facets of self-concept and their importance. *Journal of Personality and Social Psychology*, *51*(6), 1224-1236.

Marsh, H.W. & Shavelson, R. (1985). Self-concept: It's multifaceted, hierarchical structure. *Educational Psychologist*, *20*(3), 107-123. doi: 10.1207/s15326985ep2003_1

McLachlan, S., Spray, C. & Hagger, M.S. (2011). The development of a scale measuring integrated regulation in exercise. *British Journal of Health Psychology, 16*, 722–743.

Miller, K.H., Ogletree, R.J., & Welshimer, K. (2002). Impact of activity behaviors on physical activity identity and self-efficacy. *American Journal of Health Behavior, 26*(5), 323-330.

Podlog, L., Gao, Z., Kenow, L., Kleinert, J., Granquist, M., Newton, M., & Hannon, J. (2013). Injury rehabilitation overadherence: Preliminary scale validation and relationships with athletic identity and self-presentation concerns. *Journal of Athletic Training,48*(3), 372-381. doi: 10.4085/1062-6050-48.2.20

Prince, S.A., Adamo, K.B., Hamel, M.E., Hardt, J., Gorber, S.C., & Tremblay, M. (2008). A comparison of direct versus self-report measures for assessing physical activity in adults: a systematic review. *International Journal of Behavioral Nutrition and Physical Activity*, *5*(1), 56. doi:10.1186/1479-5868-5-56.

Reifsteck, E.J. (2011). *The relationship between athletic identity and physical activity levels after retirement from collegiate sports* (Master's Thesis). Retrieved from http://libres.uncg.edu/ir/uncg/f/Reifsteck_uncg_0154M_10621.pdf

Reifsteck, E.J., Gill, D.L., & Brooks, D.L. (2013). The relationship between athletic identity and physical activity among former college athletes. *Athletic Insight, 5*(3), 271-284.

Raudsepp, L., Liblik, R., & Hannus, A. (2002) Children's and adolescents' physical self-perceptions as related to moderate to vigorous physical activity and physical fitness. *Pediatric Exercise Science, 14,* 97-106.

Ryan, R.M. & Deci, E.L. (2000). Intrinsic and extrinsic motivations: Classic definitions and new directions. *Contemporary Educational Psychology, 25,* 54-67. doi: 10.1006/ceps.1999.1020

Ryan, R.M., Williams, G.C., & Patrick, H., Deci, E.L. (2009). Self-determination theory and physical activity: The dynamics of motivation in development and wellness. *Hellenic Journal of Psychology, 6,* 107-124.

Sarna, S., Sahi, T., & Koskenvuo, M., & Kaprio, J. (1993) Increased life expectancy of world class male athletes. *Medicine and Science in Sport and Exercise, 25*(2), 237-244.

Satorra, A., & Bentler, P.M. (1994). Corrections to test statistics and standard errors in covariance structure analysis. In A. von Eye and C.C. Clogg (Eds.), *Latent variable analysis: Applications to developmental research* (pp. 399-419). Newbury Park: Sage.

Shavelson, R. J., Hubner, J. J., & Stanton, G. C. (1976). Self-concept: Validation of construct interpretations. *Review of Educational Research, 46*(3), 407-441.

Springer, J.B., Lamborn, S.D., & Pollard, D.M. (2013). The importance of basic psychological need satisfaction in developing the physically active self. *American Journal of Health Promotion, 27*(5), 284-293. doi: 10.4278/ajhp.110211-QUAL-62.

Stambulova, N., Alfermann, D., Statler, T., & Cote, J. (2009). ISSP position stand: Career development and transitions of athletes. *International Journal of Sport and Exercise Psychology, 7*, 395-412.

Stephan, Y., Bilard, J., Ninot, G., & Delignieres, D. (2003a). Repercussions of transition out of elite sport on subjective well-being: A one year study. *Journal of Applied Sport Psychology, 15*(4), 354-371. doi: 10.1080/714044202

Stephan, Y., Bilard, J., Ninot, G., & Delignieres, D. (2003b). Bodily transition out of elite sport: A one-year study of physical self and global self-esteem among transitional athletes. *International Journal of Sport and Exercise Psychology, 1*(2), 192-207. doi: 10.1080/1612197X.2003.9671712

Strachan, S.M., Fortier, S., Perras, G.M., & Lugg, C. (2012). Understanding variations in identity strength through identity theory and self-determination theory. *International Journal of Sport and Exercise Psychology*, *11,* 1-13. doi: 10.1080/1612197X.2013.749005

Strachan. S.M., Woodgate, J., Brawley, L.R., & Tse, A. (2005). The relationship of self-efficacy and self-identity to long-term maintenance of vigorous physical activity. *Journal of Applied Biobehavioral Research, 10*(2), 98-112.

Stryker, S. & Burke, P.J. (2000). The past, present, and future of identity theory. *Social Psychology Quarterly, 63*(4), 284-297.

Taylor, J., & Ogilvie, B. C. (1994). A conceptual model of adaptation to retirement process among athletes. *Journal of Applied Sport Psychology, 6*, 1-20.

Thøgersen-Ntoumani, C. & Ntoumanis, N. (2006). The role of self-determined motivation in the understanding of exercise-related behaviours, cognitions and physical self-evaluations. *Journal of Sports Sciences, 24*(4), 393-404. doi: 10.1080/02640410500131670

U.S. Department of Health and Human Services. Office of Disease Prevention and Health Promotion. *Healthy People 2020.* Washington, DC. Available at healthypeople.gov. Accessed December 2, 2013.

Visek, A.J., Hurst, J.R., Maxwell, J.P, & Watson, J.C. (2008) A cross-cultural psychometric evaluation of the Athletic Identity Measurement Scale, *Journal of Applied Sport Psychology, 20*(4), 473-480. doi: 10.1080/10413200802415048

Vlachopoulos, S.P, Kaperoni, & Moustaka, F.C. (2011). The relationship of self-determination theory variables to exercise identity. *Psychology of Sport and Exercise, 12*, 265-272. doi:10.1016/j.psychsport.2010.11.006

Whaley, D.E., & Ebbeck, V. (2002). Self-schemata and exercise identity in older adults. *Journal of Aging and. Physical Activity, 10*, 245-259.

Winninger, S.R. (2007) Self-determination theory and exercise behavior: An examination of the psychometric properties of the Exercise Motivation Scale. *Journal of Applied Sport Psychology, 19(*4), 471-486. doi: 10.1080/10413200701601466

Witkowski, S., & Spangenburg, E. E. (2008). Reduced physical activity and the retired athlete: a dangerous combination? *British Journal of Sports Medicine, 42*, 952-953. doi: doi:10.1136/bjsm.2008.054353

Wilson, P.M. & Muon, S.. (2008). Psychometric properties of the Exercise Identity Scale in a university sample. *International Journal of Sport and Exercise Psychology*, *6*, 115-131.

Wilson, P.M., Rogers, W.M., & Fraser, S.N. (2002). Examining the psychometric properties of the Behavioral Regulation in Exercise Questionnaire. *Measurement in Physical Education and Exercise Science, 6*(1), 1-12. doi: 10.1207/S15327841MPEE0601_1

Yin, Z. & Boyd, M.P. (2000). Behavioral and cognitive correlates of exercise self-schemata. *The Journal of Psychology: Interdisciplinary and Applied, 134*(3), 269-282.

APPENDIX A

MEASURES

BREQ-2 (Markland & Tobin, 2004))

Why do you engage in exercise?

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

		Not true for me		**Sometimes true for me**		**Very true for me**
1	I exercise because other people say I should	1	2	3	4	5
2	I feel guilty when I don't exercise	1	2	3	4	5
3	I value the benefits of exercise	1	2	3	4	5
4	I exercise because it's fun	1	2	3	4	5
5	I don't see why I should have to exercise	1	2	3	4	5
6	I take part in exercise because my friends/family/partner say I should	1	2	3	4	5
7	I feel ashamed when I miss an exercise session	1	2	3	4	5
8	It's important to me to exercise regularly	1	2	3	4	5
9	I can't see why I should bother exercising	1	2	3	4	5
10	I enjoy my exercise sessions	1	2	3	4	5

11	I exercise because others will not be pleased with me if I don't	1	2	3	4	5
12	I don't see the point in exercising	1	2	3	4	5
13	I feel like a failure when I haven't exercised in a while	1	2	3	4	5
14	I think it is important to make the effort to exercise regularly	1	2	3	4	5
15	I find exercise a pleasurable activity	1	2	3	4	5
16	I feel under pressure from my friends/family to exercise	1	2	3	4	5
17	I get restless if I don't exercise regularly	1	2	3	4	5
18	I get pleasure and satisfaction from participating in exercise	1	2	3	4	5
19	I think exercising is a waste of time	1	2	3	4	5

Additional Integration Subscale (McLachlan, Spray, and Hagger, 2011)

Exercise is essential to my identity and sense of self.	1	2	3	4	5
Exercise is genuinely part of me	1	2	3	4	5
Exercise is consistent with my values, goals and aims in life	1	2	3	4	5
Doing exercise and being myself are inseparable.	1	2	3	4	5

Exercise Identity Scale (Anderson & Cychosz, 1994)

Please rate the extent to which you agree or disagree with each statement below based on how you would currently describe yourself.

	Strongly Disagree						Strongly Agree
1.) I consider myself an exerciser	1	2	3	4	5	6	7
2.) When I describe myself to others, I usually include my involvement in exercise.	1	2	3	4	5	6	7
3.) I have numerous goals related to exercising.	1	2	3	4	5	6	7
4.) I need to exercise to feel good about myself.	1	2	3	4	5	6	7
5.) Others see me as someone who exercises regularly.	1	2	3	4	5	6	7
6.) For me, being an exerciser means more than just exercising.	1	2	3	4	5	6	7
7.) I would feel a real loss if I were forced to give up exercising.	1	2	3	4	5	6	7
8.) Exercise is something I think about often.	1	2	3	4	5	6	7
9.) Physical exercise is central factor to my self-concept	1	2	3	4	5	6	7

Athletic Identity Measurement Scale
(Brewer, Van Raalte, & Linder, 1993; Brewer & Cornelius, 2001)

Consider the following statements as they relate to your personal self-perceptions about being an athlete and playing your chosen sport. Please rate the extent to which you agree or disagree with each statement below based on how you would currently describe yourself.

7-item version:

	Strongly Disagree						Strongly Agree
1.) I consider myself an athlete	1	2	3	4	5	6	7
2.) I have many goals related to sport	1	2	3	4	5	6	7
3.) Most of my friends are athletes	1	2	3	4	5	6	7
4.) Sport is the most important part of my life	1	2	3	4	5	6	7
5.) I spend more time thinking about sport than anything else	1	2	3	4	5	6	7
6.) I feel bad about myself when I do poorly in sport	1	2	3	4	5	6	7
7.) I would be very depressed if I were injured and could not compete in sport	1	2	3	4	5	6	7

Items from the 10-item version deleted from the 7-item version:

I need to participate in sport to feel good about myself

Other people see me mainly as an athlete

Sport is the only important thing in my life

Godin Leisure Time Exercise Questionnaire (Godin & Shepard,1985)

In this section, we would like to ask you about your current physical activity and exercise habits that you perform regularly, at least once a week. Please answer as accurately as possible.

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

	Times/week	Minutes/session
STRENUOUS EXERCISE (HEART BEATS RAPIDLY): e.g.- running, jogging, elliptical, hockey, football, soccer, racquetball, basketball, cross country skiing, martial arts, roller skating, vigorous swimming, vigorous long distance bicycling	____	____
STRENUOUS EXERCISE (HEART BEATS RAPIDLY): e.g.- running, jogging, elliptical, hockey, football, soccer, racquetball, basketball, cross country skiing, martial arts, roller skating, vigorous swimming, vigorous long distance bicycling	____	____
MILD EXERCISE(MINIMAL EFFORT): e.g.-yoga, archery, fishing, bowling, golf, easy walking	____	____

2.) **Please list specific physical activities that you participate in regularly.**

Demographics

We would like to ask you a few questions about your personal background and sport experience. Remember, responses will not be traced back to you individually, but your answers to these questions will provide us with general background information.

Were you a college athlete at a NCAA Division I institution?
___Yes
___No (If no, what level did you compete at?)

How old are you? (age in years)

What gender do you identify with?
___Male
___Female
___Other

What race/ethnicity do you identify with?
___White/Caucasian
___African American
___Native American
___Asian/Pacific Islander
___Hispanic/Latina/o
___Other

What is the highest level of education you have completed?
___Some college
___Baccalaureate Degree
___Graduate Degree
___Other

Are you currently employed?
___Yes
___No

If you are employed, what is your current occupation?

Are you currently a student?
___Yes
___No

What sport did you play in college?

How long has it been since your last official collegiate competition?
___Less than 6 months
___6-12 months
___1-5 years
___6-9 years
___10 years or more

In college were you mostly a....
___Starter
___Regular sub
___Rarely played

In which of the following ways do you still play the sport you played in college (Check all that apply)?
___Community/recreational league
___Club league
___Professional
___I no longer play this sport

What other ways do you continue to be involved in this sport (e.g., coaching, administration, officiating, etc)?

What competitive sports do you currently participate in regularly?

Do you have an injury or physical condition that limits or prevents your participation in physical activity?

___No
___Yes (please explain)

Regular exercise" is any moderate or vigorous physical activity (e.g., brisk walking, aerobics, basketball, bicycling, dance, jogging, swimming, soccer) performed 3-5 times a week for 20-60 minutes per session. According to the definition, do you exercise regularly? Check the one that applies to you:

___Yes, I have been exercising regularly for MORE than 6 months.
___Yes, I have been exercising regularly for LESS than 6 months.
___No, but I intend to start exercising regularly in the next 30 days
___No, but I intend to start exercising regularly in the next 6 months.
___ No, and I do not intend to start exercising regularly in the next 6 months.

APPENDIX B

PARTICIPANT CONSENT FORM

UNIVERSITY OF NORTH CAROLINA AT GREENSBORO

CONSENT TO ACT AS A HUMAN PARTICIPANT: LONG FORM

Project Title: Physical Activity Participation among Former College Athletes

Project Director: Diane L. Gill, Erin J. Reifsteck

What is the study about?

This is a research project. Your participation is voluntary. The purpose of this study is to examine college athlete alumni perceptions about physical activity participation.

Why are you asking me?

You are being asked to participate in this study because you competed at the NCAA Division 1 level within the past ten years.

What will you ask me to do if I agree to be in the study?

In this study, you will be asked to complete several questionnaires related to your physical activity experience. These surveys will be administered electronically by clicking on a provided link that will allow you to access the questionnaires. You can access these surveys from any computer that has internet access. Total participation should last approximately 15-20 minutes to complete the surveys.

Is there any audio/video recording?

There is no audio or video recording involved in this study.

What are the dangers to me?

The Institutional Review Board at the University of North Carolina at Greensboro has determined that participation in this study poses minimal risk to participants. You may feel uncomfortable sharing information over the internet, but your answers are confidential and will not be traced back to you.

If you have any concerns about your rights, how you are being treated or if you have questions, want more information or have suggestions, please contact the Office of Research Integrity at UNCG told-free at (855) 256-2351. Questions, concerns or complaints about this project or benefits or risks associated with being in this study can be answered by Erin J. Reifsteck or Diane L. Gill who may be contacted at (336) 334-4683 or via email at ejreifst@uncg.edu or dlgill@uncg.edu.

Are there any benefits to me for taking part in this research study?

There are no direct benefits to participants.

Are there any benefits to society as a result of me taking part in this research?

Data collected in this study may provide information that could be used for the development of physical activity life skills programs for NCAA athletes.

Will I get paid for being in the study? Will it cost me anything?

There are no costs to you or payments made for participating in this study.

How will you keep my information confidential?

All Information obtained in this study is strictly confidential unless disclosure is required by law. You will not put your name on any surveys, and no participants will be identified individually in any reports. Data will be stored online in the password-protected Qualtrics account and will be downloaded on password-protected UNCG computer and/or password-protected student laptop.

Absolute confidentiality of data provided through the Internet cannot be guaranteed due to the limited protections of Internet access. Please be sure to close your browser when finished so no one will be able to see what you have been doing.

What if I want to leave the study?

You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect you in any way. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state.

What about new information/changes in the study?

If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

Voluntary Consent by Participant:

By checking the box below, you are agreeing that you read this consent form and you fully understand the contents of this document and are openly willing consent to take part in this study. All of your questions concerning this study have been answered. You are agreeing that you are 18 years of age or older and are agreeing to participate in this study described to you by Erin Reifsteck.

◉ I have read and understood this consent form and am voluntarily participating in this study.

Check the box and click "NEXT" on the bottom of the screen to continue.

APPENDIX C

ADDITIONAL FIGURES

Figure 12

Preliminary Confirmatory Factor Analysis for the AIMS

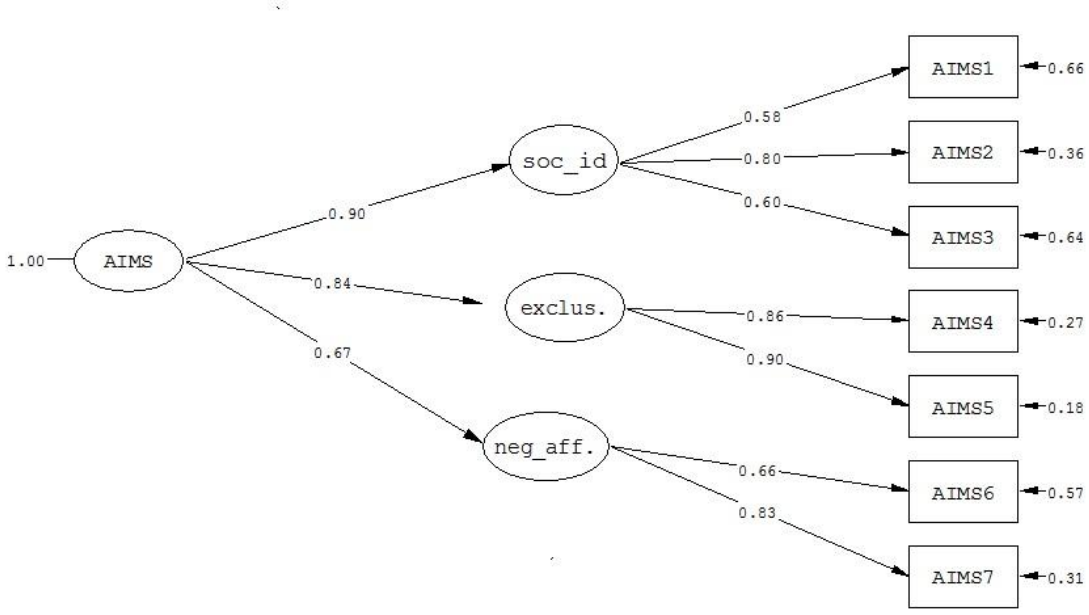


Figure 13

Preliminary Confirmatory Factor Analysis for the EIS

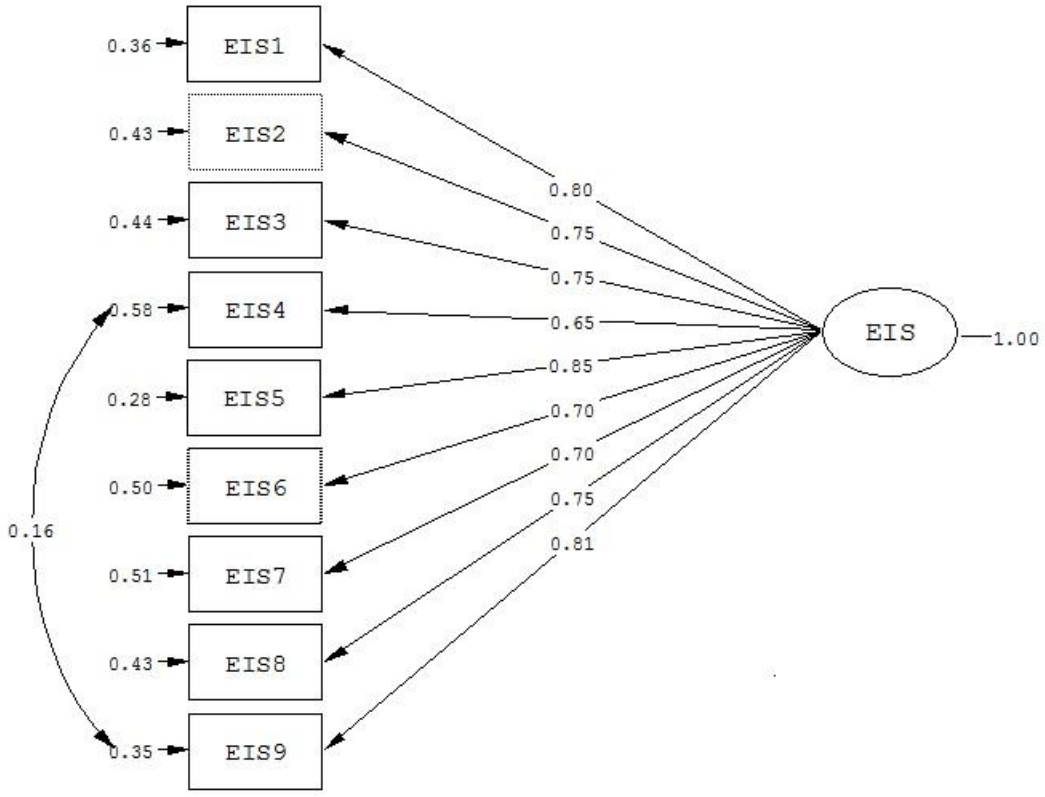


Figure 14

Preliminary Confirmatory Factor Analysis for the BREQ-2 Plus Integrated Subscale

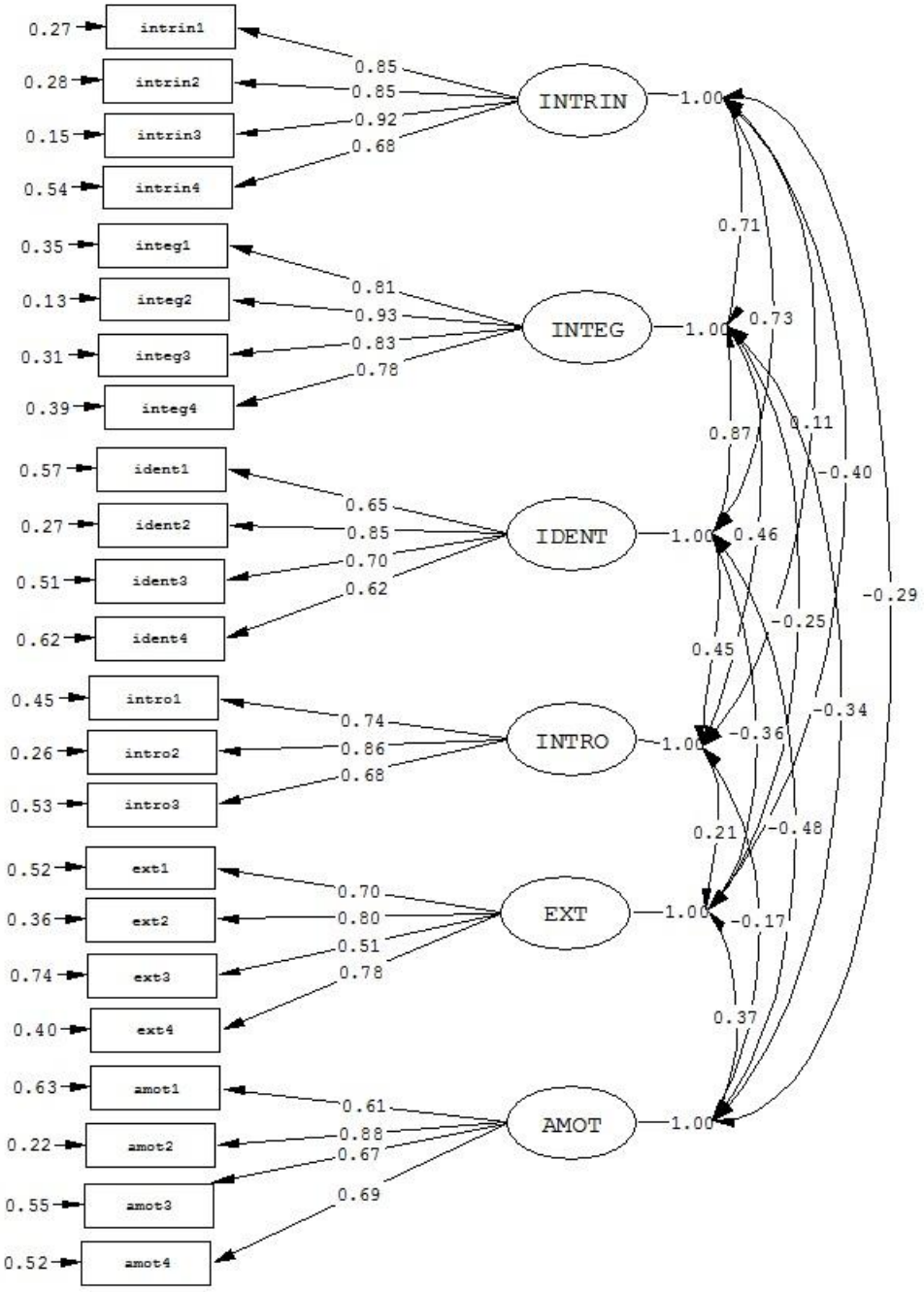


Figure 15

Motivation and Physical Activity Model

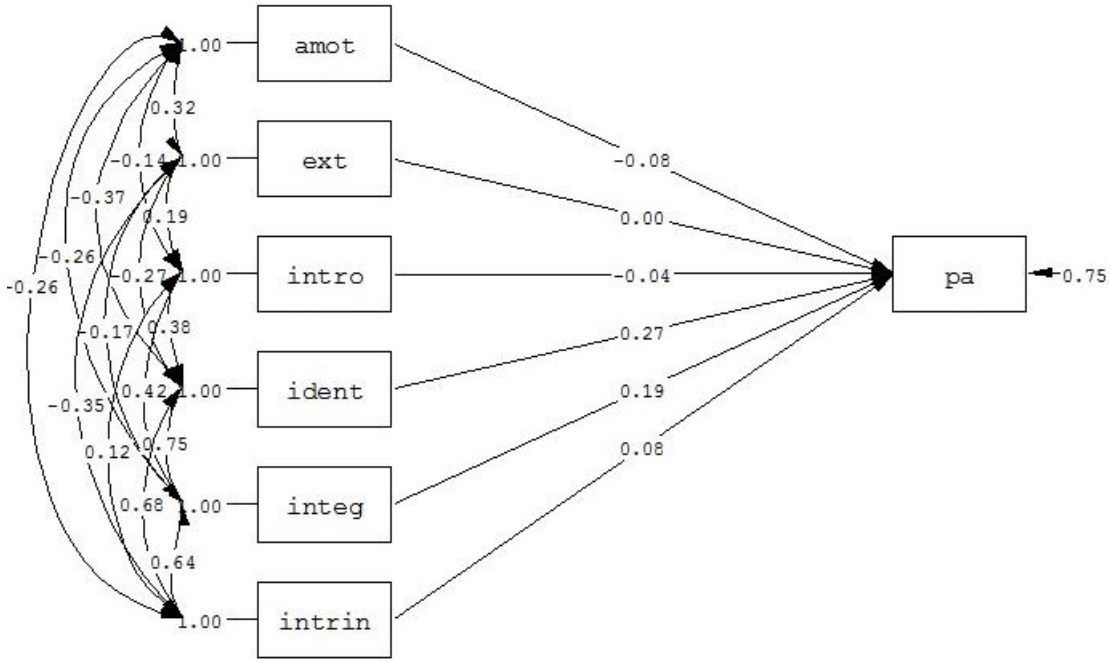


Figure 16

Original Exercise Identity, Motivation, and Physical Activity Model

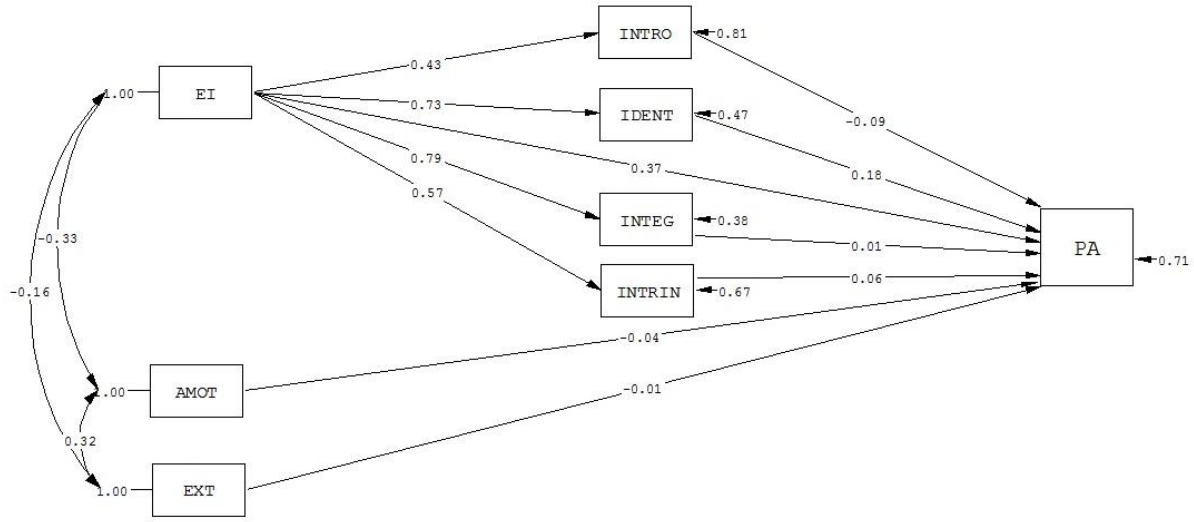


Figure 17

Original Athletic Identity, Motivation, and Physical Activity Model

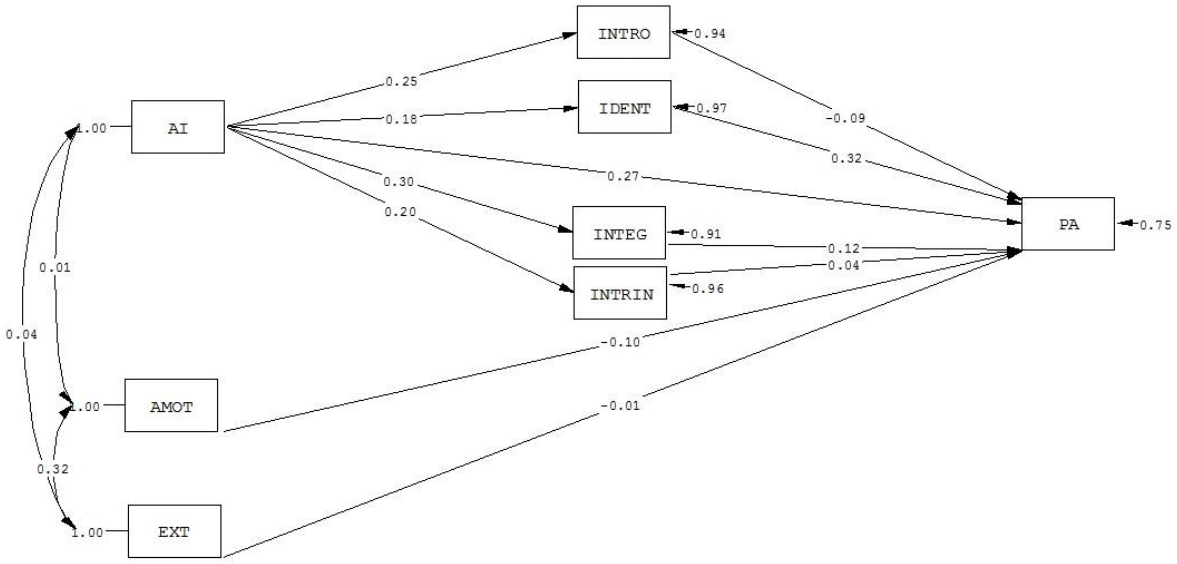


Figure 18

Athletic Identity, Motivation, Physical Activity Model Allowing Introjected, Identified, Integrated, and Intrinsic to Covary