College Students and Athletes: Identity Adherence, Injury, Illness, Depression, Social Support, and Problem Behaviors

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ABSTRACT

Author: Nekvasil, Samuel, L. PhD
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College students are at pivotal time in their life for identity development. They are typically away from home for the first time, independently making decisions while also striving to maintain their academic performance. A subset of this population, college athletes, face a number of unique challenges often connected with their potentially competing identities as athletes and students (i.e., athletic and academic identities). In addition, when injury/illness occurs, identity adherence may shift for all students (i.e., athletes and non-athletes) and there is the potential that they may engage in problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating). Participants for the present study were 541 undergraduate students (i.e., 386 non-athletes, 128 intramural/club athletes, and 27 Division I athletes) attending a large Midwest university. A 2 (i.e., injured/ill versus non-injured/ill) X 3 (i.e., non-athletes, intramural/club athletes, Division I athletes) MANCOVA indicated that although problem behaviors did not differ based on injury/illness status, intramural/club athletes reported greater illicit drug use and problem alcohol use than their non-athlete and Division I athlete peers. In addition, Division I athletes exhibited higher adherence to their athletic identity than did intramural/club athletes. For all athletes, depression was positively associated with disordered eating and BMI was positively associated with problem alcohol use, whereas GPA was negatively associated with problem alcohol use. In addition, although non-injured Division I athletes engaged in lower risky sexual
behaviors than their intramural/club peers, when injured, they exhibited higher risky sex than intramural/club athletes. The results of the present study have the potential to decrease problem behavior-related assumptions regarding Division I athletes, to aid in the creation of specific therapeutic interventions for college students, and to inform future research with college athletes.
CHAPTER 1. INTRODUCTION

Overview of the Problem

College athletes, specifically Division I athletes, are a unique population in that they are under enormous pressure to manage their athletic successes and failures, balance their school work and athletic requirements, and cope under extreme physical demands (Brenner & Swanik, 2007; Grossbard, Geisner, Nighbors, Kilmer, & Larimer, 2007; Leichliter, Meilman, Presley, & Cashin, 1998; Sabo, Miller, Melnick, Farrell, & Barnes, 2002; Watson, 2002; Yusko, Buckman, White, & Pandina, 2008). They are going to school, sometimes away from home for the first time in their lives, while pursuing their potentially highest level of physical performance. This specific population must perform on the court, field, rink, or pitch in order to stay competitive, while simultaneously maintaining a grade point average to ensure eligibility to participate in collegiate sports and possibly to continue scholarship funding. College athletes are also choosing their social group and closest friends. Developmentally, just as is the case with their non-athlete peers, college athletes are choosing who they would like to be and what life path they would like to take. Although traditional-age college students (i.e., 18-25 year-olds; Cavanaugh, 2016) tend to be well-represented in the literature, identity struggles for college athletes, particularly when injuries and illnesses take them out of their sport, are not typically the focus of empirical attention.

Identity formation is a crucial part of the human maturation process (Erikson, 1963; 1968). Identity is defined as an ever-changing, never-static way in which people’s self-view, personality, membership in social or cultural groups, characteristics of thinking, and sense of meaning all interact with one another (Erikson, 1963; 1968; Levinson, 1986; Vander & Pace, 1984). Although the formation of identity takes place throughout most of life, certain time periods seem to have an
exceptionally profound impact on identity development. According to Erikson (1963; 1968), the most crucial period for identity formation and development is during adolescence and young adulthood (i.e., ages 12-25 years). Due to some significant sociocultural changes (e.g., the increasing age at which people are completing college, choosing vocations, and committing to life partners) in Western society since Erikson’s (1963; 1968) writings, the formation of identity seems to have shifted to the later end of this range. More specifically, Arnett’s theory of emerging adulthood (2000; 2014) has argued that the ages 18-25 year old time period is the most formative for identity development for most individuals in industrialized countries (Fadjukoff, Kokko, & Pulkkinen, 2010).

During this college age period (i.e., ages 18-25 years), identity development can seem like a complex task as individuals typically are just beginning to develop and investigate their identities (Roberts & Donahue, 1994). Chickering and Reisser (1993) eloquently compared this process of identity development for college students to “assembling a jigsaw puzzle or remodeling a house” (p. 48). Although most people tend to occupy multiple identities, college students are in an especially sensitive development period as they are exploring, testing, and experimenting with multiple identities (Jones & Abes, 2013). Where all members of the traditional college age group must navigate through identity struggles, college athletes, the focal population of this study, must endure a number of stressors associated with having identities connected to both athletics and academics. One of the most common stressors college athletes face is sports injuries.

Sports injuries are occurring with increasing frequency in college sports, affecting a large number of college athletes. As determined by the National Collegiate Athletic Association (NCAA, 2014), in order to be defined as an injury, a college athlete must miss at least two days of athletic activity. Every year in the United States, approximately 12,500 sports injuries occur in
collegiate-level athletics, taking college athletes out of practice and/or competition (Thomas, 2014). Of these injuries, twenty-five percent are considered “severe,” wherein athletes miss 10 or more days of practice and/or competition (Thomas, 2014). According to a report conducted by the Centers for Disease Control and Prevention (CDC, 2010), just under 12 million hospital emergency room visits were due to sports injuries among the general population.

With statistics such as these, college student athletes are likely to encounter an injury at some point in their college careers. Thomas (2014) found that in men’s college football, 36 season-ending injuries per 1000 athletes occur each season. With 252 Division I football teams averaging 100 players per squad (i.e., 25,200 total players), that would mean over 700 season-ending injuries occur each year. Women’s cheerleading accounts for 70.5% of the catastrophic injuries (i.e., fatal, disabling, or serious; Thomas, 2014) among female college athletes, making it their most dangerous sport. When looking at the specific demographics of sports injuries in college, it appears that both men and women sustain a similar number of injuries, with the difference being mainly the location of the injuries. Male athletes are most likely to sustain a head injury (e.g., a concussion), and female athletes are most likely to experience a knee injury (e.g., an ACL tear) in college sports (Thomas, 2014).

In addition to injuries, according to Iliades (2011), college athletes may also experience illnesses (e.g., mononucleosis, meningitis, flu viruses, sexually transmitted infections) that can take them out of sports participation. These illnesses, in conjunction with injuries, were considered in the present study.

The injuries and illnesses that college athletes sustain not only affect their physical bodies but also may impact their mental well-being, adherence to their identities, and problem behaviors. Sustaining a loss of sport-participation because of an injury or illness may affect well-being in
ways that include, but are not limited to, increased depression and anxiety (Green & Weinberg, 2001) and decreased self-esteem and life satisfaction (Kleiber & Brock, 1992). Whereas all members of the college age group must navigate through the requisite identity struggles of emerging adulthood, college athletes must endure a number of stressors associated with both the athletic and academic realms (Heird & Steinfeldt, 2013). Furthermore, when college athletes experience health-related struggles, they may begin to question their athletic identity (Armstrong & Oomen-Early, 2009). When a primary identity is questioned, individuals may begin engaging in problem behaviors (Jessor & Jessor, 1977). Problem behaviors include, but are not limited to, risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating (Fischer & Smith, 2008; Jessor & Jessor, 1977).

Risky sexual behavior is widespread on college campuses and for college athletes in particular across the United States. Among sexually-active college students on Midwestern campuses, nearly 25% had been diagnosed at least one time with a sexually transmitted infection (Berman, 2013). College athletes are actually at a higher risk for sexually transmitted infections than their non-athlete peers due to the influence of their peers and teammates, their likelihood to change partners frequently, and their use of drugs and alcohol (Chernoff & Davison, 2005; McBride, Reece, & Sanders, 2008).

Illicit drug use is also a pivotal concern for college athletes. Although rates of illicit drug use remain high for the non-athlete college population, college athletes tend to have low prevalence rates regarding use of cocaine, crack, psychedelics, and other illicit drugs (Tricker & Connolly, 1997). Illicit drugs that are performance-enhancing, however, seem to be on the rise for college athletes (Yusko et al., 2008). Of the extensive list of available performance-enhancing drugs, the most common ones that are increasing in use for college athletes are ephedrine and amphetamines.
to escalate endurance (Bents, Tokish, & Goldberg, 2004), nutritional drugs to lose weight and maintain peak performance (Froiland, Koszewski, Hingst, & Kopecky, 2004), and painkillers to reduce the effects of injuries (Tricker, 2000).

Additionally, problem alcohol use is an issue for college athletes. Of the entire college student population, male college athletes have the highest rate of problem alcohol use (Yusko et al., 2008). They report significantly higher numbers of heavy drinking episodes over the last year when compared to the non-athlete population. College athletes are at higher risk for problem alcohol use due to their tendency to consume alcohol in extremes (Hildebrand, Johnson, & Bogle, 2001; Leichliter et al., 1998; Wechsler, Davenport, Dowdall, Grossman, & Zanakos, 1997).

Disordered eating also negatively affects college athletes. According to some studies (e.g., Greenleaf, Petrie, Carter, & Reel, 2009; Holm-Denoma, Scaringi, Gordon, Van Orden, & Joiner, 2009), the rate of disordered eating is higher among college athletes when compared to non-athletes because of the link between exercise and disordered eating. Female college athletes, in particular, are the highest group at risk due to the pressures to conform to societal standards of physical beauty in combination with the demands to perform athletically in their sport (Greenleaf et al., 2009). Although male athletes seem to participate in disordered eating less frequently than their female counterparts, the statistics surrounding male disordered eating are most likely underreported and, therefore, often overlooked (Greenleaf et al., 2009).

In this study, I took into account factors such as identity adherence, injury, illness, and problem behaviors. Specifically, my focus was on examining the relationships among engagement in problem behaviors and identity adherence in connection with an injury or illness.
Importance of the Study

First, further research is necessary within the college athlete population to ascertain whether a connection exists between injury/illness status (i.e., injury/illness or no injury/illness) and engagement in problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating). This research allowed for the examination of the potential link between injury/illness status and engagement in problem behaviors and was needed to determine if college athletes require additional psychoeducation that informs them on healthy ways to cope if and when an injury/illness occurs. Second, few studies have focused on the relationship between identity adherence (i.e., academic identity and athletic identity), injury/illness status (i.e., injury/illness or no injury/illness), and engagement in problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating). Injury has been studied, as have the effects of injuries. However, a dearth of research exists in the area of illnesses. Furthermore, the way in which college athletes respond following an injury or illness has not been evaluated in terms of identity loss in connection with problem behaviors. The present study represents a novel approach to these variables in that identity adherence, injury/illness status, and problem behaviors were all evaluated in relation to one another.

Regarding practice, the field of college student athlete health is in need of more focus on prevention. In order to curb college athletes’ possible engagement in problem behaviors, college athletic personnel need to design relevant interventions. College athletes are typically at the center of a great deal of attention and pressure, but that focus does not always mean mental health support and/or interventions. Possible interventions might include an educational course, wherein college athletes learn about the potential risks for injury or illness and what they can do to cope with the difficult life stressors present with the demands of being a college athlete. The primary
psychoeducational interventions could focus on the possible susceptibility of engaging in problem behaviors after an injury/illness and decrease in identity adherence. A secondary psychoeducational intervention could focus on those college athletes who have already been injured, in order to minimize their challenges to identity so as to prevent increased engagement in problem behaviors.

**Statement of Purpose**

The first purpose of this study was to determine whether college athletes’ adherence to their athletic and academic identities varied based on injury/illness status (i.e., injury/illness or no injury/illness). The second purpose was to determine whether college athletes’ problem behavior (e.g., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating) varied based on injury/illness status. The third purpose was to determine whether injury status, levels of identity adherence (i.e., academic and athletic identity adherence), depression, and social support contributed to problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating) for college athletes. The final purpose was to explore whether college athletes’ adherence to their athletic and academic identities, levels of depression, and levels of social support moderated the relationship between injury/illness status (i.e., injury/illness or no injury/illness) and engagement in problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating).
Terminology and Concepts

Throughout this study, I use terms that may be unfamiliar to readers. In order to clarify those terms, I provide some definitions.

- The term *college athletes* refers to individuals in the traditional college age range (i.e., 18-25 years) who are enrolled in college while also participating in collegiate-level sports. These sports can include those on the varsity, club, and intramural levels.

- The term *identity* refers to people’s formation of a consistent and well-rounded view of themselves (Chickering & Reisser, 1993). Also included in identity are the roles which people fill or the tasks which people complete (Stryker & Serpe, 1982; Hoelter, 1983; Serpe, 1987). *Identity* in singular form refers to the overall makeup of these facets within individuals. *Identities* refers to the multi-faceted nature of identity in people.

- The term *identity adherence* refers to the level at which individuals are aligned with a particular identity or identities.

- The term *athletic identity adherence* refers to “the degree to which people identify with the athletic role” (Brewer, Van Raalte, & Linder, p. 237, 1993). The athletic role includes participating in events in connection with athletic teams and activities.

- The term *academic identity adherence* refers to the degree to which people identify with the academic role. The academic role includes participating in school/student activities.

- The term *injury/illness status* refers to whether or not a college athlete has had a cessation of sport for at least two days (NCAA, 2014) due to an injury or illness. Injury/illness status will be considered “severe” if athletes miss 10 or more days of sport participation as a result of an injury or illness (Thomas, 2014).

- The term *problem behaviors*, as defined by Jessor and Jessor (1977), are behaviors that
are deemed undesirable by conventional society. These problem behaviors can be minimal (e.g., speeding) or extreme (e.g., murder) and are typically determined by societal norms (Costa, 2005). The current study focuses on four specific problem behaviors that appear particularly connected with the experience of college athletes (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating).

- The term *transitional proneness*, as defined by Costa (2005), refers to the increased likelihood that individuals going through life development changes and/or transitions might participate in problem behaviors. For the present study, the cessation in sport participation as the result of an injury or illness will be considered a transition for college athletes.

- The term *athletic involvement* refers to whether a college student is an athlete or non-athlete.

- The term *athletic level* refers to the specific levels of college athletes (i.e., intramural, club, or Division I).

### Relevance to Counseling Psychology

The present study, and its corresponding variables, are consistent with the professional identity, themes, and roles of counseling psychology. First, the focus on college students is consistent with the historical focus of the field of counseling psychology and the theme of education and career development. Second, the theme of working with intact personalities within the normative range of development is expressed in the present study. Third, the preventative role of counseling psychology is highly connected to the purposes of the present study.

Historically, counseling psychology has had a solid presence on college and university campuses across the United States (Gelso & Fretz, 2001). This presence has led to a strong
emphasis on educational and career development, which is one of the themes of counseling psychology (Gelso & Fretz, 2001). The present study was focused on educational and career development in that the sample population was college students. College athletes’ identities are crucial to the issue of education and career development. The present study, and potential interventions drawn from it, was focused on college athletes’ identity adherence and the difficult stressors (e.g., injury, illness) they may encounter along their way. Specifically, the potential interventions that could be taken from this study would be intended to aid college athletes in their coping methods after they sustain a decrease in identity adherence following an injury or illness.

Second, the counseling psychology theme of working with intact personalities inside the normative range of development is present in this study. Injuries, specifically, are common for college athletes. When college athletes encounter an injury or illness that removes them from competition, they are faced with an adjustment issue rather than a diagnosable concern. As Gelso and Fretz (2001) described, counseling psychologists are focused on people with intact personalities, as opposed to people who have severe mental illnesses. The participants in this study would most likely not have profound mental illnesses, therefore, this study fits in the theme of working with intact personalities within the normative developmental range.

Third, the preventative role of counseling psychology occurs in the present study in that the data have implications for the primary, secondary, and tertiary levels of prevention. The main goal of the primary and secondary levels of prevention is to anticipate problems before they arise and manifest themselves (Gelso & Fretz, 2001). Regarding the primary level of prevention, the present findings could potentially aid coaches, trainers, sports psychologists, and other mental health professionals by providing useful information from which to form psychoeducational programs for their college athletes. This psychoeducation could focus on the potential risks and
struggles that may occur following an injury/illness and reduction in identity adherence. Regarding the secondary level of prevention, the findings might aid sports personnel by providing them with information to assist college athletes who have already been injured or become ill. This information may enable sports personnel to quickly identify and treat those athletes who have recently had an injury and/or illness and are removed from participation in their sport(s). Specifically, sports personnel may be primed to closely monitor and treat those athletes who have recently had an injury and/or illness and are removed from participation in sport. On the tertiary level of prevention, the present findings may aid college sports personnel who are already working with injured/ill individuals who are currently engaging in problem behaviors.
CHAPTER 2. REVIEW OF LITERATURE

In this chapter, I offer a review of the primary literature bases that formed the foundation of the current study. More specifically, I summarize the relevant research that has been conducted on college athletes and injury, college students and identity, college athletes and identity, and college athletes and problem behaviors. The first purpose of this study was to determine whether college athletes’ adherence to their athletic and academic identities varied based on injury/illness status (i.e., injury/illness or no injury/illness). The second purpose was to determine whether college athletes’ problem behavior (e.g., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating) varied based on injury/illness status. The third purpose was to determine whether injury status, levels of identity adherence (i.e., academic and athletic identity adherence), depression, and social support contributed to problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating) for college athletes. The final purpose was to explore whether college athletes’ adherence to their athletic and academic identities, levels of depression, and levels of social support moderated the relationship between injury/illness status (i.e., injury/illness or no injury/illness) and engagement in problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating).

College Athletes and Injury

When college athletes sustain an injury and/or illness and their participation in sport is subsequently delayed or ended, they may experience a number of negative secondary effects that could be closely connected to a decrease in adherence to their athletic identities. Some of those negative secondary effects include heightened depression, greater anxiety, and decreased life satisfaction and self-esteem. Each of these negative secondary effects is inextricably linked to
college athletes’ identities. It is important to note that I did not find literature on how illnesses are experienced by college athletes. Therefore, in this section I focused only on the experience of injury. My empirical emphasis in the present study on both injury and illness in the current study makes a useful contribution to the literature on college athletes.

Putukian (2016) found that injuries can often activate responses such as depression and anxiety. According to Putukian (2016), the most significant predictor of negative response to an injury was the severity of the injury. The more serious the injury, the more likely athletes were to experience depression and other negative effects (Putukian, 2016). Chan and Grossman (1988) found that injured runners typically reported higher levels of depression than non-injured runners. In their study, conducted with 343 male, intercollegiate athletes among 10 different sports, Leddy, Lambert, and Ogles (1994) found that injured athletes experienced greater levels of depression than non-injured athletes even two months after their injuries. Often connected with depression, anxiety levels are also usually affected when college athletes sustain an injury and/or illness.

Covassin, Crutcher, Bleecker, Heiden, Dailey, and Yang (2014) found that athletes typically have higher levels of anxiety following an injury. The anxiety of injured college athletes can revolve around several factors, from fear of losing a scholarship to fear their positions will be taken by non-injured athletes (Putukian, 2016). Etnier (2013) also found that injured college athletes can often have higher anxiety about the possibility of sustaining another injury, when compared to non-injured athletes.

In addition to anxiety and depression, life satisfaction and self-esteem also seem to be affected by injuries. Kleiber and Brock (1992) found that, especially for college athletes who were planning on playing their sport professionally, levels of life satisfaction and self-esteem were negatively affected following career-ending injuries. Smith, Scott, O’Fallon, and Young (1990)
also found that injured college athletes typically have decreased levels of self-esteem in comparison to non-injured athletes.

Connected to these negative effects (i.e., increased depression and anxiety, decreased life satisfaction and self-esteem) is the overarching theme of college athletes’ sense of self, or identity. College athletes are affected holistically when they can no longer participate in their sport, as their sport is an integral part of their identity. Blinde and Stratta (1992) found when college athletes face an involuntary cessation of their sport, the negative secondary effects from an injury/illness are most strongly connected with college athletes’ unexpected changes with their athletic identity. When college athletes can no longer participate in their sport, which is often a significant part of their identity, they may typically experience higher levels of depression and anxiety and lower levels of life satisfaction and self-esteem.

For elite athletes, such as those individuals competing in college sports, identity is typically linked to their ability to participate in sports (Lavallee, Grove, Gordon, & Ford, 1998). Petitpas & Danish (1995) found that when something such as an injury and/or illness takes college athletes out of their sport, they are likely to suffer feelings of loss to their identity adherence that may even exceed their physical challenges. Furthermore, the loss of sport via an injury/illness could equate to loss of college athletes’ self-concept, values, and emotional balance (Petitpas & Danish, 1995). As Brewer et al. (1993) noted, the most crucial losses for an injured college athlete are loss of identity, loss of importance, and an overall loss of an aspect of self.

**College Students and Identity**

The age range between 18-25 years is a crucial time for identity development (Erikson, 1963; 1968) and overlaps with the traditional age range for college students (Cavanaugh, 2016). In fact, the principal theories of college student development are focused primarily on issues of
identity development (Chickering & Reisser, 1993; Hardy, Francis, Zamboanga, Kim, Anderson & Forthun, 2013; Kroger, 2007; Schwartz, Luyckx, & Vignoles, 2011). Chickering and Reisser (1993) built their theory of identity development mainly upon Erikson’s (1968) theory of psychosocial development, with identity development for college students at its core. I offer a general overview of their theory followed by a more in-depth examination of the three vectors (i.e., developing competence, managing emotions, and establishing identity) that apply most to injured college athletes and, therefore, to the present study.

Within their theory, Chickering and Reisser (1993) proposed that identity development occurs through seven stages that they refer to as vectors. The seven vectors suggested by Chickering and Reisser (1993) in their conceptualization of college student identity development are as follows: developing competence, managing emotions, moving through autonomy toward interdependence, developing mature interpersonal relationships, establishing identity, developing purpose, and developing integrity. Developing competence is broken down further to intellectual competence, physical and manual skills, and interpersonal competence; these skills increase as students gain confidence (Evans, Forney, Guido, Patton, & Renn, 2010). Managing emotions pertains to college students learning to express what emotions will be accepted by the majority of people and how to negotiate emotional expression without feeling embarrassed or being ostracized (Evans et al., 2010). Moving through autonomy toward interdependence is a crucial step for college students wherein they become more interdependent on themselves and others around them and less so on their previous support systems (Chickering & Reisser, 1993). Chickering and Reisser (1993) argued that when college students are developing mature interpersonal relationships, they need to tolerate differences between themselves and others as well as to develop a capacity for intimacy with others. Establishing identity, which seems to be most connected to
injured/ill college athletes in the current study, takes place when college students strive to evaluate potential life courses, explore activities they enjoy, and develop a sense of satisfaction with themselves and how other people see them (Chickering & Reisser, 1993). Developing purpose occurs when college students realize what activities in life (e.g., getting a specific job, volunteering for a non-profit organization, or playing professional sports) will bring them happiness, joy, satisfaction and energy (Chickering & Reisser, 1993). The final vector, developing integrity, transpires when college students form and implement values in their lives that are consistent and synonymous with their beliefs (Chickering and Reisser, 1993).

**College Athletes and Identity**

The three vectors from Chickering and Reisser (1993) that are most relevant to college athletes are developing competence, managing emotions, and establishing identity. Although all vectors are interdependent, the vector of establishing identity was perhaps the most crucial for the present study.

Although all three elements of developing competence (i.e., intellectual competence, physical and manual skills, and interpersonal competence) are vital to college student identity development, developing physical/manual skills is a particularly critical factor for college athletes who are performing, potentially, at the highest athletic level of their lives. Physical/manual competence occurs when individuals develop the skills to participate in athletic and artistic activities (Chickering & Reisser, 1993). For college athletes, this vector is highly relevant as athletic pursuits demand a high level of physical performance. As Chickering and Reisser (1993) explained, when individuals participate in tangible competition, they are developing their physical/manual competence.
As college athletes continue to become more physically/manually competent, they will most likely identify themselves primarily as athletes, as opposed to other identities such as students, musicians, or artists (Brewer et al., 1993; Bunce, 2013; Kleiber & Kirshnit, 1991). As Heird and Steinfeldt (2013) suggested, when individuals encounter success, compliments, and acceptance for qualities they possess, they are more likely to adhere to identities wherein they can use those qualities. If a sports injury or illness were to remove college athletes from athletic competition, college athletes might question their physical/manual competence as a result of their inability to participate in sports. As Bunce (2013) suggested, when college athletes have an injury, they may engage in negativistic self-views as a result of no longer being able to participate in their sport, which may, in turn, evolve into a questioning of their whole identity.

For college athletes, the vector of managing emotions can be particularly poignant, given the wide range of emotions experienced by athletes struggling to perform at high levels. Successful movement through this vector occurs when individuals are able to recognize what emotions they are feeling, while simultaneously being able to manage and control those emotions to a certain degree (Chickering & Reisser, 1993). Most importantly, the vital aspect to development through this vector is that individuals are able to face intense situations and are still able to function appropriately. For example, when individuals face difficult emotions like fear, anxiety, shame, or depression, they can experience these emotions and still operate their routine on a daily basis (Chickering & Reisser, 1993; Evans, et al., 2010).

With regard to the managing emotions vector, Romo (2014) suggested college athletes face three unique challenges when compared to non-athlete college students: personal uncertainty, social uncertainty, and future uncertainty. Personal uncertainty includes college athletes fearing the possibility of becoming injured, as well as feeling overwhelmed while balancing the demands
of a schoolwork and an athletic regimen (Romo, 2014). Social uncertainty includes college athletes worrying about who their “real friends” are due to their commitments to teammates with whom they are highly encouraged to get along (Romo, 2014). Future uncertainty includes college athletes becoming anxious about whether they will be successful in post-college sports, or if they will be able to maintain a career outside of sports (Romo, 2014). If college athletes experience a season-ending injury and/or illness, they may experience feelings of uncertainty, alongside other negative emotions, which can be particularly difficult to manage.

Injuries and/or illness may interfere with the mature development of emotion management, resulting in college athletes potentially overwhelming their capacity to manage their emotions. According to Putukian (2016), if college athletes are unable to manage their emotions in healthy ways, they may engage in problem behaviors such as risky sexual behavior, problem alcohol use, illicit drug use, or disordered eating. According to a study conducted by the NCAA, college athletes’ emotional difficulties following an injury and/or illness may include sadness, isolation, anger, frustration, lack of motivation, disengagement, and lack of appetite (Putukian, 2016). In addition to these emotions, after an injury and/or illness which removes them from competition, college athletes might be fearful of losing their scholarships (Strauss, 2014), which may lead to deepening feelings of abandonment and anger. Injuries or illnesses, especially ones that are season-ending, can be emotionally devastating for college athletes (Putukian, 2016). To any particular college athlete, a season-ending injury or illness could mean the end to a scholarship which provided the only way to earn an education. To other athletes, a season-ending injury could mean a lower likelihood of advancing to a professional career, thus changing a potential life course. According to Putukian (2016), a maladaptive response to such an arduous event for a college
athlete could be potentially life-threatening (e.g., potential suicidal ideation, drug overdose, contraction of a sexually transmitted disease, or alcohol poisoning).

College athletes’ alignment with the athletic facet of their selves is key to their overall identity. Chickering and Reisser (1993) argued that college students’ identities form as they become comfortable with their physical appearance and their gender, race, sexual orientation, and other multiple aspects of self. Additionally, college students’ identities form when they attain a sense of self in multiple contexts, clarify their self-concept through their life-style and roles, develop a level of self-acceptance and self-esteem, and establish personal stability and integration (Chickering & Reisser, 1993). Those successes could be manifested in popularity, sports trophies, social acceptance, and other displays of positive encouragement and reinforcement. Thus, most college athletes are likely to have a strong connection to their athletic identity due to the high amount of success encountered over a long period of time, beginning at a young age (Bunce, 2013). Baillie and Danish (1992) suggested that college athletes also have a large incentive to form a strong connection to their athletic identity because higher status is typically given, particularly in the United States, to people who are athletically gifted (i.e., physically competent), as compared to people who do not participate in athletics. A strong motivator exists for college athletes to embrace their athletic identity, because successful athletes tend to experience high social status, acceptance, and encouragement (Callero, 1985; Danish, 1983; Werthner & Orlick, 1986). Regarding college athletes, if an illness or injury were to occur, it is possible they may question a core facet of their athletic identity, thus potentially altering college athletes’ establishing identity phase.

Chickering described the vector of establishing identity as the “process of discovering with what kinds of experiences, at what levels of intensity and frequency, we resonate in satisfying, in
safe, or in self-destructive fashion” (1969, p. 6). This vector is built upon the previous vectors of developing competence and managing emotions but is much more than an amalgamation of vectors (Chickering, 1969). Establishing identity, for college athletes, arguably, has an inextricable link to participation in sport. For people who are involved in high-level competition, identity and athletic ability are typically intertwined and cannot be parsed (Lavallee, Grove, Gordon, & Ford, 1998). As Gordon and Lavallee (2012) found, college athletes can often equate their bodies and athletic abilities with their whole identity and as their primary source of intrinsic motivation. If and when an injury or illness were to threaten college athletes’ ability to participate in sport, college athletes may actually feel a threat to their overall identity.

**College Students and Multiple Identities**

Identity development for college students is especially complex in that individuals can have multiple identities (Funder & Colvin, 1991; Luyckx, Soenens, Goossens, & Vansteenkiste, 2007; Ozer, 1986; Roberts & Donahue, 1994; Serpe, 1987; Stryker & Serpe, 1982). College students, in particular, are just beginning to develop their identities, which makes this period of development especially poignant.

Humans can and do adhere to multiple identities (Roberts & Donahue, 1994). For instance, individuals can simultaneously see themselves as parents, spouses, and employees. These identities are typically associated with the roles which people fill or the tasks which people complete (Hoelter, 1983; Serpe, 1987; Stryker & Serpe, 1982). In Tajfel and Turner’s (1979) seminal work, Social Identity Theory, they argued that people have multiple identities which are attached to the social groups in which they interact. What people do, who people socialize with, and how people see themselves is critical to how people identify themselves (Tajfel & Turner,
So, although one person may exist in a physical body, that person can be connected with and fulfill many different identities (Baumeister, 1986).

College students have the additional difficulty of forming their multiple identities while their roles in life are rapidly changing (Wahl & Scholl, 2014). This population is negotiating shifts and changes with their multiple identities (e.g. siblings, children, students, athletes) while also making potentially life-altering choices. Each identity may feel as if it is a moving target due to the number of changes that are occurring in individuals’ lives. For example, when individuals go to college, many will have to form new identities, as they are no longer living at home. Even though they may still be siblings and children, they are also now independent college students. College students’ identities are going through shifts and evolutions, and each identity may even be shifting at different time frames.

Even though college students have multiple identities, it is typical for them to most strongly connect those identities with the internal and external sources which have provided the most support (Brewer et al., 1993). Thus, the degree of identity adherence (i.e., stronger adherence versus weaker adherence) to each identity usually occurs in connection with internal (e.g., personal satisfaction and pride) and external sources of support (e.g., reinforcement from a teacher or approval from a parent; Roberts & Donahue, 1994). For example, if college students obtain high internal satisfaction from earning As in class, as well as external pressure from their parents in the form of verbal praise, they would be more likely to form stronger adherence to their identity as a student (i.e., academic identity). Similarly, if college athletes experience a sense of pride and achievement when they are successful in their sport, and they also receive praise and respect from their coaches and teammates, they will be more likely to form strong adherence to their role as an athlete (i.e., athletic identity).
College Athletes and Multiple Identities: Academic and Athletic

Several theorists (Hugenberg & Bodenhausen, 2004; Macrae, Bodenhausen, & Milne, 1995) argue that individuals can fulfill multiple identities, even though they primarily adhere to only one or two of those identities. Watt and Moore (2001) found that collegiate student athletes typically adhere to both their academic and athletic identities as their primary identities, as opposed to their less primary identities (e.g., child, sibling, musician, artist, actor), due to the high level of support they received in the past for both academics and athletics.

Amid all of their multiple identities, college athletes are likely to have developed a high level of adherence to their academic identity. Because college is a place where academic achievement is held in high regard, those who attend college are required to meet high expectations. Chorba, Was, and Isaacson (2012) studied a college student sample at a large Midwestern university and found a positive association between the value students placed on their education and the likelihood that they identified themselves as students (i.e., academic identity). If students are going to succeed in college, they must maintain dedication to their scholastic endeavors. College is also a setting where there is a-priori selection, wherein young adults who are drawn to college must have some commitment to academics and also have been successful enough in high school to meet admission requirements for college. Additionally, college athletes are likely to have received high levels of support from external (e.g., parents, siblings, friends, and coaches) and internal sources (e.g., sense of accomplishment, pride, acceptance; Watt & Moore, 2001). Because of this, it is likely that college students will have strong adherence to their academic identity (Chorba, Was, & Isaacson, 2012). In contrast to college students whose sole focus in college is on academics, college athletes also tend to have a strong adherence to their athletic identity.
When athletes reach the collegiate level of playing their sport, there is a high likelihood that they will have a high level of adherence to their strong athletic identity (Bunce, 2013). Athletic identity, as defined by Brewer et al. (1993), is “the degree to which people identify with the athletic role” (p. 237). Individuals typically begin to develop strong adherence to their athletic identities as they encounter success in their sport, which may even begin at a young age (Kleiber & Kirshnit, 1991; Brewer et al., 1993). When children are praised for their athletic achievements (e.g., scoring a touchdown or winning a diving competition), they are more likely to adhere to their athletic identity (Brewer et al., 1993). As their success continues throughout elementary, middle and high school, the adherence to their athletic identity tends to increase (Brewer et al., 1993). And in most cultures, being identified as an athlete carries with it an honor and a privilege, which also provides an incentive for young people to strongly adhere to their identity as athletes (Baillie & Danish, 1992). By the time people reach the collegiate level of their sport, it is highly likely that they have received years of success and accolades, which might further solidify college athletes’ propensity to have strong adherence to their athletic identities (Bunce, 2013). As Brewer et al. (1993) noted, with this praise in conjunction with the high status (i.e., popularity in school for youngsters) equated with athletic prowess, people might be inclined to have high levels of adherence to their athletic identity as they continue to meet success.

College athletes are required to balance the demands of strong adherences to two potentially competing identities (i.e., student and athlete). The demands associated with each role may come into conflict with one another. For instance, when college athletes have class assignments, tests, and other projects for which they are responsible (i.e., student role) as well as practices, games, and demanding travel schedules (i.e., athlete role), they must meet the corresponding requirements for both roles. College athletes may struggle to balance these
demands. The tension that may be created between strong adherence to the academic identity and strong adherence to their athletic identity likely compounds the pressure college athletes face.

**College Athletes, Social Identity Theory, and Threats to Identity**

Managing academic and athletic demands alone would be a challenge for most people. Coupled with those demands, college athletes also have the possibility of succumbing to an injury or illness which could take them out of athletic competition. When such a major component of college athletes’ lives (i.e., athletic identity) is threatened with partial or full extinction (i.e., via injury and/or illness), college athletes may react in negative ways (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating). The Social Identity Theory (Tajfel & Turner, 1979) is a lens through which to view the process wherein college athletes may attach themselves to their social groups and thereby form their identities, as well as how they might react if their social identity were to be threatened.

In their Social Identity Theory, Tajfel and Turner (1979), suggested that people form groups based on similarities and commonalities. Furthermore, once people are in social groups, they seem to gain their personal identity from their membership in those groups. These social groups can actually be difficult to exit once established (Tajfel & Turner, 1979; Hogg & Terry, 2000). Petriglieri (2011) proposed that individuals’ identities are rooted in the individuals’ group memberships as well as the individuals’ unique characteristics, traits, and abilities they bring to the group.

Tajfel and Turner (1979), in their Social Identity Theory, propose that people will most readily develop and join social groups based upon similarities such as interests, talents, and personalities. For example, if a callout for a chess club were announced in a high school, it is highly likely that individuals who are interested in strategy and gaming will answer the callout, as
opposed to people who are highly social, physically active, and not as interested in strategy games. Similarly, if individuals are physically adept, it is possible and perhaps even likely that they will become involved in athletic activities, thus surrounding themselves with other athletic people who very well may become their teammates. This formulation of social groups can often have a profound impact on individuals, as the function of these social groups “creates and defines an individual’s own place in society” (Israel & Tajfel, 1972, p. 292).

Membership in social groups may translate into the creation or solidification of parallel elements of personal identity. According to both Social Identity Theory (Tajfel & Turner, 1986) and Identity Theory (Stryker, 1987; Stryker and Burke, 2000), individuals typically are drawn to identities that increase and sustain self-worth. And so, if individuals are highly skilled with athletic performance, it is likely they will be drawn toward social groups that are athletic in nature (Gecas, 1982). The longer individuals are in these groups, which are founded on elements of identity, the more salient those identities will become (Ashforth, 2001). If and when those highly-salient identities are threatened, it is likely that individuals will have reactions to those threats (Petriglieri, 2011).

According to Social Identity Theory, there can be threats to identity, and much of the research in this area has focused on stereotyping as a primary threat to group memberships and, therefore, social identity. For example, Stone, Yates, and Caruthers (2002) suggested that racial stereotypes affect social identities of Black and White athletes. Specifically, negative stereotypes for White men suggest they are not as athletically gifted as Black men, which in turn might discourage White men from participating in athletic competition (Stone, Yates, & Caruthers, 2002). Positive stereotypes, which are still harmful, for Black men suggest that they are athletically superior, which can encourage Black men to focus on sports more and academics less (Stone,
Yates, & Caruthers, 2002). Black men have an additional negative stereotype which suggests they are not as academically gifted as their White peers; this stereotype may result in higher rates of withdrawal from school (Osborne & Walker, 2006). Regarding women and social identity threat, Gresky, Eyck, Lord, and McIntyre (2005) observed that women have a negative stereotype that suggests they are not as gifted in mathematics, resulting in a withdrawal of many women from science, technology, engineering, or mathematical (STEM) courses, majors, and subsequent careers. Although most Social Identity Theory literature refers to threat of identity as a result of stereotyping (e.g., Gresky, Eyck, Lord, & McIntyre, 2005; Osborne & Walker, 2006; Stone, Yates, & Caruthers, 2002), the literature also includes possible other threats such as feeling alienated from a group as a result of dissimilar characteristics (Liebkind, 1983), and questioning of the sense of self (Kreiner & Sheep, 2009). For the purposes of the current study, I argue that a threat to membership in the social group of athletes could be threatened as a result of an illness and/or injury.

Factors other than stereotyping may result in threat to identity, specifically regarding the effects of injury and/or illness on college athletes. Based on current literature, researchers seem to agree that when identity threat occurs, three factors are present: reduction of self-worth (Ashforth, Kreiner, Clark, & Fugate, 2007), loss of connection with the threatened identity (Anteby, 2008), and the decrease or cessation of ability to express the threatened identity (Maitliss, 2009; Shepherd & Haynie, 2009). Injuries and illnesses can be classified as an identity threat to college athletes based on this current definition. If college athletes sustain an injury and/or illness that removes them from competition, they are likely to experience reduction of self-worth (Putukian, 2016), feel less connected to their sport and team (Putukian, 2016), and have a decreased ability to engage in physical activities (Shepherd & Haynie, 2009).
When threats to identity occur, either through stereotyping or injury/illness, individuals’ reactions to such threats can be organized into two responses (i.e., identity-protection responses and identity-restructuring responses; Petriglieri, 2011). Petriglieri (2011) further broke down those two responses into six categories, three categories associated with each of the two responses.

Petriglieri (2011) suggested that within identity-protection responses, individuals will engage in one of three approaches: either derogation, concealment, or positive-distinctiveness. Derogation occurs when individuals ignore or downplay the threat to their identity (Petriglieri, 2011; Sykes & Matza, 1957). Concealment happens when individuals attempt to hide the identity that is being threatened (Petriglieri, 2011; Tajfel, 1978). Positive-distinctiveness is when individuals look at the threat to their identity in a positive way and ignore the threat entirely (Petriglieri, 2011).

Within identity-restructuring responses, Petriglieri (2011) suggested individuals will engage in one or more of the following three approaches: identity exit, meaning change, or importance change. Identity exit occurs when individuals disengage from whatever identity is being threatened (Ashforth, 2001; Petriglieri, 2011). Meaning change happens when individuals change what the threatened identity means to them for future goals (Burke, 2006; Petriglieri, 2011). Importance change is when individuals alter (i.e., typically lower) the level of importance of the threatened identity (Crocker & Major, 1989; Petriglieri, 2011).

Petriglieri’s concepts regarding identity threat lend valuable insights into the possible responses of college athletes who experience injury and/or illness. More specifically, it is likely college athletes will engage in meaning change and/or importance change when they suffer an injury and/or illness that threatens their athletic identity. Regarding identity exit, college athletes may shift to adhering to their academic identity more strongly than their athletic identity after
suffering an injury and/or illness that threatens their athletic identity. If college athletes do not participate in identity exit (i.e., adhering more strongly to their academic identity), they may be more likely to engage in problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating).

An important consideration is that the more self-defining an identity, and the greater an individual adheres to that identity, the greater the psychological distress the individual will experience when that identity is threatened (Ellemers, Spears & Doosje, 2002; Swann, 1987). According to Petriglieri (2011), little attention has been given to what happens between the onset of an identity threat and the consequences/impact of the reactions to that identity threat. In the current study, I anticipated that if college athletes encountered a threat to their athletic identity (i.e., injury/illness) and they did not participate in identity exit, they would be more likely to respond to that threat by engaging in problem behaviors such as risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating.

**College Athletes and Problem Behaviors**

Whenever individuals become disillusioned with, or begin to question, their core identities (e.g., when college athlete experiences an injury and/or illness), it is possible they may attempt to cope with this confusing and painful process by engaging in problem behaviors (Putukian, 2016). More specifically, the Problem Behavior Theory defines problem behaviors as “behavior that is socially defined as a problem, as a source of concern, or as undesirable by the social and/or legal norms of conventional society and its institutions of authority; it is behavior that usually elicits some form of social control response, whether minimal, such as a statement of disapproval, or extreme, such as incarceration” (Costa, 2005, p. 1). For the purposes of the current study, I focused on the problem behaviors most relevant to college athletes, including risky sexual behavior, illicit

**Jessor and Jessor’s Problem Behavior Theory (PBT)**

In their Problem Behavior Theory (PBT), Jessor and Jessor (1977) argued that people have three distinct systems that govern behavior. I define each of these systems to provide a rationale for why these systems are connected to the specific purposes of the current study. Importantly, the age group upon which this theory and research was/has been based is almost entirely individuals in the adolescent to college age range (i.e., 13-25 years old). Parts of this theory draw on developmental issues (e.g., academic achievement and school peer group) that are often a key focus for this specific age range.

According to PBT (Jessor & Jessor, 1977), individuals have a perceived-environment system, personality system, and behavior system. It is important to note that all three systems interplay (Costa, 2005). The perceived-environment system is comprised of individuals’ surroundings, composed entirely of other people and culture. The personality system is defined as individuals’ patterns of values, beliefs, and attitudes. The behavior system is defined as ways in which individuals act and respond to stimuli in their environment.

In Figure 1 below, I offer a model to illustrate the PBT blocks. These three building blocks are interdependent in that the perceived-environment-system will affect the personality system, and the personality system will affect the behavior system, and so on. Thus, according to PBT (Jessor & Jessor, 1977), each of the three blocks does not stand alone.
Jessor and Jessor (1977) have argued that there are “instigations” and “controls” that exist in each block. Instigations encourage individuals to engage in problem behaviors, whereas controls discourage individuals from engaging in problem behavior. The balance or imbalance of these instigations and controls variables determines whether those individuals will engage in problem behaviors (Costa, 2005). Below I offer information regarding each of the three building blocks, instigations and controls (i.e., protective and risk factors), contributions of life events on individuals, transitional proneness, and empirical studies focused on PBT.

The perceived-environment system is defined as how individuals see their social environment, how they view the rules and obligations in that environment, and how they perceive the authority figures in that environment (Jessor, 2014). The perceived-environment system is comprised of individuals’ interpretation and internalizing of social controls, models, and supports, as well as the distance (i.e., proximal or distal) individuals perceive themselves to be from those social controls, models, and supports (Costa, 2005). Social control is defined as the amount society tries to conform its members to patterns of behavior that the society deems acceptable (Janowitz,
Models, as defined by Jessor (2014), are typically people whom individuals look up to and try to emulate. Supports are defined as people in individuals’ lives who may have influence on individuals’ behavior, such as parents, teachers, or coaches, but are not necessarily people whom individuals are trying to emulate (Jessor, 2014). The variables in this system are conceptualized by their level of impact upon individuals in terms of distance. Proximal variables are the closest, most impactful variables and include peer models due to the level of impact which peers have on one another (Costa, 2005). Furthermore, it is likely college athletes will develop close and intimate relationships with the peers with whom they play and compete (NCAA, 2014); therefore, these people become proximal variables. Distal variables, conversely, are farther away and more indirect in their impact upon individuals’ behavior (Costa, 2005). An example of a distal variable would be a person in the life of a college athlete who does not have an intimate, impactful relationship with the college athlete (e.g., grandparent with whom they rarely interact). Jessor and Jessor (1977) suggested that if individuals have high peer models (i.e., high instigating and proximal social control) for problem behaviors, along with low parental disapproval (i.e., low control and distal control), those individuals would be more likely to engage in problem behaviors.

The personality system is made up of beliefs, attitudes, values, and expectations which have been developed through and affected by social learning (i.e., observing, modeling, and imitating) and individual development (i.e., as a result of environment and genetics; Costa, 2005). In order to encapsulate and not exclude facets of individuals’ identities, and to emphasize wholeness, the authors of PBT have recently changed the title of “personality system” to simply “the person” (Jessor, 2014). Based on the theory, individuals are more likely to become involved in problem behaviors if they place lower value on academic achievement and also exhibit higher alienation, lower self-esteem, and lower religiosity (Costa, 2005; Jessor & Jessor, 1977).
Conversely, if individuals place higher value on their academic achievements and exhibit lower social alienation, higher self-esteem, and higher religiosity, they will be less likely to engage in problem behaviors. The entire block of the personality system is connected to the sense of self and identity of individuals. The key concepts of the perceived-environment, personality, and behavior systems in PBT are aligned with the Chickering and Reisser (1993) vectors of developing competence, managing emotions, and establishing identity.

The behavior system is composed of the activities in which individuals regularly and routinely engage on a daily basis, as opposed to their daily activities on any given or specific day. The PBT does not consider single occurrences of behavior, but rather overall behavioral patterns in individuals’ lives (Jessor & Jessor, 1977). In this block, the instigations would be previous engagement with problem behaviors and the controls would be previous engagement in conventional behaviors. Therefore, the behavior system is comprised of individuals’ engagement in both problem behaviors (e.g., problem alcohol use, illicit drug use, and general deviant behavior) and also their engagement in conventional behaviors which are not viewed as deviant by society (Costa, 2005). And so, according to PBT, a predictor of future behavior is past behavior.

The concept of transitional proneness within PBT may help predict how college athletes might respond to the experience of an injury and/or illness. College students are undergoing an intense time of identity transitions per their normal development. They are typically leaving home, picking a future career, and entering a new social network. The intensity of these identity transitions might be even higher for college athletes when they are physically unable to participate in their sport. Due to the decrease in identity adherence that potentially takes place when college athletes encounter an injury or illness which takes them out of sport competition, it is possible that they will have a tendency to cope with that change in identity adherence with behaviors such as
risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating.

Although PBT may not seem modern in terms of its age, it has demonstrated its value and efficacy throughout years of research (De Leo & Wulfert, 2013; Mobley & Chun, 2013; Ndugwa, Kabiru, Clelan, Beguy, Egondi, Zulu, & Jessor, 2010; Vazsonyi, Chen, Jenkins, Burcu, Torrente, & Sheu, 2010; Wickwire, McCausland, Whelan, Luellen, Meyers, & Studaway, 2008). The interactions between individuals’ personalities and their environment, according to PBT (Jessor & Jessor, 1977), are what primarily contribute to individuals behaving in a certain way. The researchers who have used the PBT have studied specific problem behaviors like binge drinking, illegal drug use, problematic internet use (De Leo & Wulfert, 2013; Mobley & Chun, 2013; Vazsonyi et al., 2010), promiscuous sexual behavior, and gambling (Ndugwa et al., 2010; Wickwire, et al., 2008).

Researchers who have used the PBT with college students have found relationships between problem behaviors and the personality system. Specifically regarding emotional responses in the personality system, the literature indicates positive relationships between both anxiety and depression and the problem behaviors of problematic internet use (De Leo & Wulfert, 2013), underage drinking and illicit drug use (Vazsonyi et al., 2010), substance use and risky sexual behavior (Mobley & Chun, 2013), risky sexual behavior (Turchik, & Gidycz, 2012), gambling (Wickwire, et al., 2008) and problem alcohol use, delinquency, illicit drug use, and risky sexual behavior (Jessor, 2014). In a half-century overview of the use of PBT, R. Jessor (2014) found that the social-psychological variables of the personality system of individuals (e.g., feeling alienated, having low self-esteem, feeling criticized by a social group) were positively correlated with participation in problem behaviors. In these empirical study examples, difficult affect (i.e., depression, alienation, low self-esteem, etc.) was positively correlated with problem behaviors.
When looking at group differences of personality systems based on adverse life events, the literature indicates a connection between the experience of adverse life events (e.g., academic stressors, relational difficulties, injuries, etc.) and engagement in problem behaviors (De Leo & Wulfert, 2013; Jessor, 2014; Mobley & Chun, 2013; Ndugwa et al., 2010).

**College Athletes, Problem Behaviors, and PBT**

College athletes have a tendency to participate in problem behaviors more than their non-athlete peers (Hildebrand et al., 2001; Leichliter et al., 1998; Nattiv, Loucks, Manore, Sanborn, Sundgot-Borgen, & Warren, 2007; Wilson, Pritchard, & Schaffer, 2004). Additionally, it is possible that college athletes have more instigators and fewer controls than non-athlete college students due to their perceived-environment, personality, and behavior systems in connection with their adherence to their athletic identity. For example, it may be possible that college athletes overall have developed high peer models with teammates who participate in problem behaviors (i.e., perceived-environment system), have a higher risk-taking personality (i.e., personality system), and have engaged in problem behaviors previously (i.e., behavior system). The problem behaviors in which college athletes appear to engage in most are risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating.

Risky sexual behavior is widespread for non-athlete college students, and even more so for college athletes, in the United States. According to the Centers for Disease Control and Prevention (CDC; 2010), risky sexual behavior is any behavior that results in an unwanted pregnancy or a sexually transmitted infection. Furthermore, the predictors for risky sexual behavior include having sex at an early age, having multiple sexual partners, having sex under the influence of drugs and alcohol, and having unprotected sex (CDC, 2010). Among sexually-active college students on Midwestern campuses, nearly 25% had been diagnosed at least one time with a sexually
transmitted infection (Reinisch, Hill, Sanders, & Ziembia-Davis, 1995). College athletes are actually at a higher risk for sexually transmitted infections than their non-athlete peers due to their propensity to experiment sexually, the influence of their peers and teammates, their likelihood to change partners frequently, and their use of drugs and alcohol (Chernoff & Davison, 2005; McBride, Reece, & Sanders, 2008). In comparison to non-athlete college students, college athletes engaged in sexual activity more often, and with more partners (Faurie, Pontier, & Raymon, 2004; Reel, Joy, & Hellstrom, 2012; Wetherill & Fromme, 2007). Having peers and teammates who engage in this risky sexual behavior might be a part of the perceived-environment system for college athletes, which would instigate them to participate in this problem behavior. Huang, Jacobs, and Derevensky (2010) found that although 86% of college students say they are sexually active, only 28% to 35% stated they use condoms on a regular basis during sexual intercourse. Furthermore, Huang, Jacobs, and Derevensky (2010) found that, when compared to female college athletes, male college athletes had higher rates of unprotected sex (10.9% vs. 7.9%) and numbers of multiple sexual partners (14.6% vs. 9.3%). In the college athlete population specifically, male athletes may be at the highest risk for sexually transmitted infections due to the pressure to fit hyper-masculinized roles (Faurie, Pontier, & Raymon, 2004).

Illicit drug use, in addition to risky sexual behavior, is a pivotal concern for college athletes. According to the World Health Organization (WHO; 2016), illicit drug use is defined as the use of any drug that is prohibited by law and includes, but is not limited to, cannabis, stimulants, cocaine, opioids and others. In their study conducted from 2005-2006 with 418 male and 475 female college students, Yusko et al., (2008) found that, 19.5% of the athlete participants stated they had used marijuana in the last 30 days, and 8.2% reported they had used an illicit drug other than marijuana. Although rates of illicit drug use remain high for the non-athlete college
population, college athletes tend to have low prevalence rates regarding cocaine, crack, psychedelics, and other illicit drugs (Green Uryasz Petr, & Bray, 2001; Tricker & Connolly, 1997). Illicit drugs that are performance-enhancing, however, seem to be on the rise for college athletes (Yusko et al., 2008). Of the extensive list of performance-enhancing drugs, the most common ones that are increasing in use for college athletes are ephedrine and amphetamines to increase endurance (Tokish, Kocher, & Hawkins, 2004), nutritional drugs to lose weight and maintain peak performance (Froiland, Koszewski, Hingst, & Kopecky, 2004), and painkillers to reduce the effects of injuries (Tricker, 2000). Of the participants in Yusko et al.’s study (2008), male college athletes were significantly more likely to use illicit performance-enhancing drugs than were their female counterparts or male non-athlete college students. Again, having peers and teammates who engage in this illicit drug use might be a part of the perceived-environment system for college athletes, which would instigate them to participate in this problem behavior. Additionally, when college athletes encounter an injury and/or illness which takes them out of their sport, it is possible that their athletic identity adherence (i.e., personality system) could decrease, and they may begin to engage in problem behaviors.

Problem alcohol use is occurring at elevated rates on campuses for non-athletes, but the statistics indicate even higher rates of problem alcohol use for college athletes. According to the National Institute on Alcohol Abuse and Alcoholism (2015), binge drinking occurs when men have five or more drinks in two hours and when women have 4 or more drinks in the same time period. These amounts result in a rise of blood alcohol content to 0.08 or higher. Approximately 70% of college students report having had a drink in the previous month, with 40% reporting binge drinking (Ford, 2007). Of the entire college student population, male college athletes have the highest rate of problem alcohol use (Yusko et al., 2008). They report significantly higher numbers
of heavy drinking episodes over the previous year when compared to the non-athlete population. College athletes are at higher risk for problem alcohol use due to their tendency to consume alcohol in extremes, typically bingeing whenever they do drink (Hildebrand et al., 2001; Leichliter et al., 1998; Wechsler et al., 1997). If college athletes drank in high school, they may be more likely to drink in college (i.e., instigator for behavior system) and even more likely if their teammates are problem alcohol use (i.e., instigator for perceived-environment). If college athletes have an injury and/or illness, they may be prone to engage in problem alcohol use as well (i.e., instigator for personality system).

Though garnering less empirical attention than risky sex, illicit drug use, and problem alcohol use, disordered eating is a growing problem on college campuses for both male and female college athletes (Greenleaf et al., 2009; Holm-Denoma et al., 2009). Disordered eating is defined as abnormal eating behaviors, often designed to reduce weight for individuals, such as bingeing and purging or restricting (Eating Disorders Victoria, 2015). Disordered eating is distinct from eating disorders in its level of severity and frequency of behaviors (Eating Disorders Victoria, 2015). Rates of disordered eating are on the rise in the overall college population, often ranging from 10.9% to 17.1% (Paulson & Rutledge, 2014). According to some studies (e.g., Greenleaf et al., 2009; Holm-Denoma et al., 2009), the rate of disordered eating is even higher among college athletes when compared to non-athletes (Greenleaf et al., 2009), perhaps due to the link between exercise and disordered eating (Holm-Denoma et al., 2009). Female college athletes, in particular, are the highest group at risk due to the pressures to conform to societal standards of physical beauty in combination with the demands to perform athletically in their sport (Greenleaf et al., 2009). Johnson, Powers, and Dick (1999) found that around 16.2% of female college athletes binged at least one time per month and 22.7% had a lifetime prevalence of binge eating. Although male
athletes seem to participate in disordered eating less frequently than their female counterparts, the statistics surrounding male disordered eating are most likely underreported and, therefore, often overlooked (Galli & Reel, 2009). Furnham, Badmin, and Sneade (2002) found that men’s amount of exercising, specifically, exercise focused on improving their physical appearance, was positively correlated with disordered eating. With the mounting pressure to conform to hyper-masculine roles, such as looking lean and muscular, it is possible that college athlete men will continue to participate in disordered eating (Galli & Reel, 2009).

Due to the transitional proneness wherein college athletes may feel their identity is beginning to shift, college athletes may be more likely to participate in these problem behaviors (Costa, 2005). The PBT would suggest that the experience of an injury and/or illness would represent a critical transition for college athletes that could lead them to engage in a higher level of problem behaviors. When college athletes experience cessation of sport via injury or illness, it may be that they experience challenging emotions such as sadness, isolation, anger, frustration, lack of motivation, and disengagement (Green & Weinberg, 2000; Putukian, 2016). These challenging feelings, often simultaneous with a potential decrease in identity adherence, might affect college athletes in that they may engage in problem behaviors in order to cope with those challenging feelings (Jessor, 2014; Jessor & Jessor, 1977). More specifically, in the perceived-environment system, an injury and/or illness might affect college athletes in that they could feel isolated (i.e., an instigator toward problem behaviors) from their peer group if they are no longer able to compete in their sport. Regarding the personality system, an injury and/or illness could affect college athletes to the point that they may question their beliefs, attitudes, and expectations (i.e., an instigator toward problem behaviors). In terms of the behavior system, an injury and/or illness might affect college athletes in a way that would cause them to turn to unhealthy methods.
to cope, as they may have done previously in their lives (i.e., instigator toward problem behaviors). Additionally, college athletes who engaged in problem behaviors prior to their injury and/or illness may be more at risk for engaging in problem behaviors after their injury and/or illness than college athletes who had not previously engaged in problem behaviors.

College athletes may have higher risk factors and fewer protective factors simply due to the fact they have higher demands as athletes (e.g., practices, weight-lifting seminars, traveling to away games) than non-athletes. Subsequently, the added pressure of completing schoolwork while also participating in highly competitive athletics with the associated risk of injury or illness, sets athletes apart as a higher-risk group. When protective factors potentially decrease (e.g., high self-esteem) and risk factors increase (e.g., low self-esteem), accompanied with the injury and/or illness which might lead to potential erosion of identity, problem behaviors could ensue for college athletes. As a result of this erosion of identity, which is linked with the instigators and controls located in the perceived-environment, personality, and behavior systems, college athletes are at higher risk to participate in problem behaviors than non-athletes. College athletes are away from their parents and other potential support models while competing in sport at the potentially highest level of their lives (i.e., perceived-environment system). They are also in a peer group where problem behaviors occur at a higher rate than non-athlete college students (i.e., perceived-environment system; Hildebrand et al., 2001; Leichliter et al., 1998; Nattiv et al., 1997; Wilson et al., 2004). College athletes have a high likelihood of encountering some type of injury or illness, which may decrease their adherence to their athletic identity (i.e., personality system). Transitional proneness, in the case of this study, is connected with an injury and/or illness for a college athlete. When a college athlete sustains an injury or illness which takes them out of sport competition, thus
potentially causing a decrease in identity adherence, they may be more likely than their non-athletic peers to engage in problem behaviors.

**Purpose, Research Questions, and Hypotheses**

College athletes are at a pivotal time in their lives, exploring and solidifying their identities (Chickering & Reisser, 1993; Hardy, Francis, Zamboanga, Kim, Anderson & Forthun, 2013; Kroger, 2007; Schwartz, Luyckx, & Vignoles, 2011). Academic and athletic identities seem to be two of the most important identities for college athletes (Hinkle, 1994; Martens & Lee, 1998; Parmer, 1994; Watt & Moore, 2001). When injury and/or illness situations arise, which result in a cessation from their sport, it is possible athletes will question their identity adherence (Armstrong & Oomen-Early, 2009; Rotella & Heyman, 1993). When college athletes are questioning their identity, they may turn to problem behaviors in order to cope (De Leo & Wulfert, 2013; Jessor & Jessor, 1977; Turbin, Jessor, Costa, Dong, Zhang, & Wang, 2006). Some of the problem behaviors that college athletes might be more prone to engage in, as compared to their non-athlete peers, are risky sex (Wetherill & Fromme, 2007), illicit drug use (Yusko et al., 2008), problem alcohol use (Hildebrand et al., 2001), and disordered eating (Greenleaf et al., 2009). My research questions and corresponding hypotheses are below:

**RQ1:** Do problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating), levels of depression, and levels of social support vary based on injury/illness status (i.e., injury/illness or no injury/illness) of college athletes or athletic involvement (i.e., non-athlete, intramural/club, Division I)?

**H1a:** College students (athletes and non-athletes) who have an injury and/or illness will participate in problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating) to a higher degree than college students
(athletes and non-athletes) with no injury or illness.

**H1b:** College students (athletes and non-athletes) who have an injury and/or illness will experience higher levels of depression and lower levels of social support than college students (athletes and non-athletes) with no injury or illness.

**RQ2:** Does college athletes’ athletic identity adherence vary based on injury/illness status (i.e., injury/illness or no injury/illness) or athletic level (i.e., intramural/club, Division I)?

**H2a:** College athletes who have an injury and/or illness will adhere more to their athletic identities than will athletes with no injury or illness.

**RQ3:** Does injury status, levels of identity adherence (i.e., academic and athletic identity adherence), depression, and social support contribute to problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating) for college athletes?

**H3a:** Injury/Illness status will have a positive relationship with all of the problem behaviors, such that individuals who have had an injury and/or illness will be more likely to engage in problem behaviors.

**H3b:** Athletic identity will be negatively associated with problem behaviors.

**H3c:** Academic identity will be negatively associated with all of the problem behaviors.

**H3d:** Social support will be negatively associated with all of the problem behaviors.

**H3e:** Depression will be positively associated with all of the problem behaviors.

**RQ4:** Does college athletes’ adherence to their athletic and academic identities, levels of depression, and levels of social support moderate the relationship between injury/illness status (i.e., injury/illness or no injury/illness) and engagement in problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating)?

**H4a:** Athletic identity will moderate the relationship between injury and/or illness such that the positive relationship between injury and/or illness and problem behaviors...
behaviors will decrease as athletic identity decreases.

H4b: Academic identity will moderate the relationship between injury and/or illness such that the positive relationship between injury and/or illness and problem behaviors will decrease as academic identity decreases.

H4c: Depression will moderate the relationship between injury and/or illness such that the positive relationship between injury and/or illness and problem behaviors will decrease as depression decreases.

H4d: Social support will moderate the relationship between injury and/or illness such that the positive relationship between injury and/or illness and problem behaviors will decrease as social support increases.

The figure below illustrates the hypothesized relationships for RQ4.

*Figure 2. Hypothesized Moderation Effects for RQ4.*
CHAPTER 3. METHOD

In this chapter, I provide the method of data collection for the current study. First, I describe the participants who took part in this study. Second, I explain the measures used for the data collection. Finally, I review the procedures I used to gather the data for this study.

Participants

A total of 541 undergraduate student athletes enrolled at a large Midwest university were the sample for this study. Among the participants, 515 (95.2%) students were domestic and 26 (4.8%) were international. Participants’ self-reported genders were 334 (61.7%) women, 200 (37%) men, and 7 (1.3%) transgender/other. The ages of the participants ranged from 18 to 25 years old ($M = 19.85; SD = 1.40$). Participants’ self-reported racial/ethnic identifications were 433 (80%) Caucasian (not of Hispanic origin), 47 (8.7%) Asian American/Asian, 19 (3.5%) African American/Black, 18 (3.3%) Biracial/multiracial, 16 (3%) Hispanic or Latino American, 3 (.6%) Middle Eastern, 3 (.6%) other, and 2 (.4%) who did not report race/ethnicity. Reported sexual orientations were 475 (87.8%) heterosexual, 30 (5.5%) bisexual, 17 (3.1%) gay/lesbian, 17 (3.1%) other, and 2 (.4%) who did not report sexual orientation. Among the participants, 529 (97.8%) were full-time students and 12 (2.2%) were part-time students. With regard to level in school, based on credit hours earned, 204 (37.7%) participants were first years, 180 (33.3%) sophomores, 56 (10.4%) juniors, and 101 (18.7%) seniors. With regard to current relationship status, 233 (43.1%) were in a relationship but not cohabitating, 221 (40.9%) single—not in a relationship, 46 (8.5%) single, casually dating, 26 (4.8%) married/partnered/cohabitating, and 13 (2.4%) engaged.
In Tables 1 and 2 below, I offer a list of all the sports that were represented in the present study and the level of participation in which the college athletes competed. Additionally, I included the total number of men, women, and transgender/other in each sport.

Table 1.

*Sport Participation for Division I Sports by Gender*

<table>
<thead>
<tr>
<th>Sport</th>
<th>Total Division I</th>
<th>Men</th>
<th>Women</th>
<th>Transgender/Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseball</td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Basketball</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Cross Country</td>
<td>8</td>
<td>1</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>Football</td>
<td>2</td>
<td>2</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Softball</td>
<td>2</td>
<td>-</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Spirit Squad</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Swim/Dive</td>
<td>7</td>
<td>2</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Track &amp; Field</td>
<td>12</td>
<td>1</td>
<td>11</td>
<td>-</td>
</tr>
<tr>
<td>Volleyball</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Totals</td>
<td>36*</td>
<td>8</td>
<td>28</td>
<td>-</td>
</tr>
</tbody>
</table>

*Note that this number is greater than overall participants for Division I, which indicates some of the athletes participate in more than one sport.*
Table 2.

**Sport Participation for Intramural/Club Sports by Gender**

<table>
<thead>
<tr>
<th>Sport</th>
<th>Total Intramural/Club</th>
<th>Men</th>
<th>Women</th>
<th>Transgender/Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>Badminton</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Basketball</td>
<td>75</td>
<td>31</td>
<td>44</td>
<td>-</td>
</tr>
<tr>
<td>Cross Country</td>
<td>10</td>
<td>6</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Disc Golf</td>
<td>5</td>
<td>4</td>
<td>1</td>
<td>-</td>
</tr>
<tr>
<td>Dodgeball</td>
<td>35</td>
<td>20</td>
<td>15</td>
<td>-</td>
</tr>
<tr>
<td>Flag Football</td>
<td>29</td>
<td>17</td>
<td>12</td>
<td>-</td>
</tr>
<tr>
<td>Floor Hockey</td>
<td>5</td>
<td>2</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Golf</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Handball</td>
<td>8</td>
<td>4</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Kickball</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Lacrosse</td>
<td>2</td>
<td></td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Racquetball</td>
<td>2</td>
<td>2</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Rowing</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Soccer</td>
<td>69</td>
<td>37</td>
<td>32</td>
<td>-</td>
</tr>
<tr>
<td>Softball</td>
<td>42</td>
<td>16</td>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td>Swim/Dive</td>
<td>6</td>
<td>1</td>
<td>5</td>
<td>-</td>
</tr>
<tr>
<td>Tennis</td>
<td>13</td>
<td>9</td>
<td>4</td>
<td>-</td>
</tr>
<tr>
<td>Track &amp; Field</td>
<td>11</td>
<td>8</td>
<td>3</td>
<td>-</td>
</tr>
<tr>
<td>Volleyball</td>
<td>113</td>
<td>35</td>
<td>78</td>
<td>-</td>
</tr>
<tr>
<td>Water Polo</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>-</td>
</tr>
<tr>
<td>Water Volleyball</td>
<td>2</td>
<td>2</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Wiffleball</td>
<td>3</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Wrestling</td>
<td>2</td>
<td>2</td>
<td></td>
<td>-</td>
</tr>
<tr>
<td>Other</td>
<td>74</td>
<td>42</td>
<td>32</td>
<td>-</td>
</tr>
<tr>
<td>Totals</td>
<td>527*</td>
<td>250</td>
<td>275</td>
<td>2</td>
</tr>
</tbody>
</table>

*Note that this number is greater than overall participants for Intramural/Club, which indicates some of the athletes participate in more than one sport
Regarding athletic involvement among the participants, 387 (71.3%) were non-athletes, and 154 (28.6%) were athletes. Regarding athletic level among the athletes, 127 (23.5%) played on the intramural and/or club level, and 27 (5.2%) played on the Division I level. Participants answered questions related to their injury/illness status (i.e., injury/illness or no injury/illness) and, if present, how their injury and/or illness affected their sport and/or academic participation. The total number of participants who reported an injury and/or illness was 129 (23.9%). Specifically, a total of 75 (13.9%) had suffered an injury/illness that negatively affected their academic participation and 54 (10%) of the participants had suffered an injury/illness that negatively affected their athletic participation.

Within the whole sample, regarding the participants who ascribed to having any injury/illness that negatively affected their academic participation, 64 (11.8 %) were able to complete the semester following the injury/illness and 11 (2.0%) were not able to complete the semester following the injury/illness. Of the injuries reported, 13 (2.4%) were to a bone, 13 (2.4%) to the brain, 8 (1.5%) to a joint, 7 (1.3%) to a muscle), 2 (.4%) to a tendon, 1 (.2%) to a ligament, and 16 (3.0%) due to other injuries. Example responses of other injuries include ear, back, and teeth injuries. Of the illnesses reported, 24 (4.4%) were affected by the common cold/flu, 10 (1.8%) by strep infections, 8 (1.5%) by mononucleosis, 5 (.9%) by foodborne illness, 37 (6.8%) by other illnesses. Example responses from other illnesses include mood disorders (e.g., depression and anxiety), allergies, and chronic illness (e.g., Crohn’s Disease). With regard to the perceived level of severity for the injury/illness that affected their academic participation, participants offered responses ranging from 1 (not severe) to 10 (severe) with a mean rating 5.91 (SD = 2.00).

Within the athlete-only sample, regarding the participants who ascribed to having any injury/illness that negatively affected their athletic participation, 31 (5.7%) did not have a season-
ending injury/illness and 23 (4.3%) had a season-ending injury/illness. Of the injuries reported, 15 (2.8%) were to a bone, 16 (3.0%) to a ligament, 18 (3.3%) to a joint, 20 (3.7%) to a muscle, 4 (.7%) to the brain, and 15 (2.8%) to a tendon, and 7 (1.3%) to other. Sample responses from other injuries include sinus injuries, herniated disks, and cartilage injuries. Of the illnesses reported, 9 (1.7%) were affected by the common cold/flu, 3 (.6%) by foodborne illness, 1 (.2%) by sexually transmitted infections/HIV, 1 (.2%) by strep infections, 1 (.2%) by mononucleosis, and 15 (2.8%) by other illnesses. Sample responses from other illnesses include pneumonia, autoimmune disease, and severe stomach aches. With regard to the perceived level of severity for the sports injury that affected their athletic participation, participants offered responses ranging from 1 (not severe) to 10 (severe) with a mean rating 6.75 (SD = 2.03).

Measures

In this section, I describe the measures I used in my study. I provide the psychometric properties of the measures’ scores (i.e., internal consistency and validity) along with sample items. I also report the Cronbach’s alphas using the current sample for each measure. In Table 2 below, I offer a list of the variables assessed and their corresponding measures, with their measurement type, total number of items, and the past and current Cronbach’s alphas.
**Table 3.**

*Summary of Variables*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Scale Name &amp; Source</th>
<th>Measurement</th>
<th>Items</th>
<th>Cronbach’s Alphas</th>
</tr>
</thead>
<tbody>
<tr>
<td>Athletic Identity</td>
<td>Athletic Identity Measurement Scale Brewer, Van Raalte, &amp; Linder, 1993</td>
<td>Likert-type</td>
<td>10</td>
<td>.81-.93</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.58*</td>
</tr>
<tr>
<td>Academic Identity</td>
<td>Modified Athletic Identity Measurement Scale Brewer, Van Raalte, &amp; Linder, 1993</td>
<td>Likert-type</td>
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<tr>
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<td>Center for Epidemiologic Studies Short Depression Scale Radloff, 1977</td>
<td>Likert-type</td>
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<td>Social Support</td>
<td>Multidimensional Scale of Perceived Social Support Zimet, Dahlem, Zimet, &amp; Farley, 1988</td>
<td>Likert-type</td>
<td>12</td>
<td>.85-.88</td>
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<td>Risky Sexual Behavior</td>
<td>Modified Sexual Behavior Questionnaire Centers for Disease Control and Prevention, 2008</td>
<td>Likert-type</td>
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<td>Disordered Eating</td>
<td>Dutch Eating Behavior Questionnaire Van Strien, Frijters, Bergers, &amp; Defares, 1986</td>
<td>Likert-type</td>
<td>10</td>
<td>.93-.95</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.78</td>
</tr>
</tbody>
</table>

*This measure was completed only by participants who identified as being an athlete at the intramural, club, or Division I levels*
**Demographic questionnaire**

Participants responded to questions regarding their age, gender, height, weight, racial/ethnic identification, sexual orientation, level in school, student status, GPA, relationship status, and domestic/international status (Appendix A). Body Mass Index (i.e., BMI) was calculated by entering the participants’ height and weight into an online BMI Conversion Calculator. Participants also answered questions related to their sports involvement. More specifically, questions assessed the sports in which the participants were involved, the level of their sports involvement (i.e., varsity vs. club vs. intramural), and whether participants had suffered an injury and/or illness. Regarding time since injury, the participants indicated whether the injury and/or illness occurred in the last two years. If the injury and/or illness did not occur during the last two years, the participants were categorized as “no injury/illness” participants.

Additionally, questions evaluated whether college athletes’ overall health condition affected their athletic participation. If the college athletes were affected by an injury and/or illness, they then reported on the type of injury and/or illness and time since the injury/illness. If they experienced an injury, participants responded to questions regarding how many days they were not able to participate in sports due to the injury, where on the body the injury occurred, whether the injury was season-ending, and their perceived level of severity of the injury. In addition to injury, participants selected whether an illness (e.g., cancer, mononucleosis, influenza) caused a cessation of sport participation and how long they were unable to participate due to the illness. Participants then indicated their perceived level of severity of the illness. Open-ended questions allowed participants to describe the specifics of the injury and/or illness which caused a cessation of participation in their particular sport(s). If participants played multiple sports and/or had
multiple types of injuries/illnesses which caused cessation of sport involvement for 10 or more days, they were allowed to respond to all parts of the survey that apply to all injuries and illnesses.

**Athletic identity**

The Athletic Identity Measurement Scale (AIMS; Brewer, Van Raalte, & Linder, 1993; Appendix B) is a 10-item, self-report scale designed to assess the degree to which people identify themselves as athletes. Sample items include, “I consider myself an athlete,” “Sport is the most important thing my life,” “Other people see me mainly as an athlete,” and “I spend more time thinking about sport than anything else.” Participants rate each item on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Higher scores indicate greater adherence to the athletic identity.

With regard to psychometrics, scores on the AIMS exhibit high (Cohen, Cohen, West, & Aiken, 2002) test-retest reliability (r = .89; Brewer et al., 1999) and internal consistency (.81 to .93; Brewer et al., 2000) in college athlete populations. Cronbach’s alpha for scores using the present sample was .58. Validity is indicated by scores on the AIMS being positively associated with self-reported involvement in sports and with perceived importance of sport (Brewer et al., 1993; Visek, Hurst, Maxwell & Harris, 2010); additionally, scores on AIMS are negatively correlated with psychological distress in college athletes (Brewer, 1993).

**Academic identity**

I used a modified version of the Athletic Identity Measurement Scale (AIMS; Brewer et al., 1993; Appendix C) to assess the degree to which people identify themselves as students. This measure is a 10-item, self-report scale designed to assess the degree to which people identify themselves as students. For the purposes of this study, I worked with the grief and loss research
team to modify the AIMS. Each of the ten items was modified to specifically focus on academic identity rather than athletic identity. For example, “Sport is the most important thing in my life” was changed to “Academics is the most important thing in my life.” Another item, “I consider myself an athlete” was reworded to say, “I consider myself a student.” And “I have many goals related to sports” was reworded to say, “I have many goals related to academics.” Each item maintained its original scoring of being rated on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Higher scores indicate greater adherence to the academic identity. Cronbach’s alpha for scores using the present sample was .84.

**Depression**

The Center for Epidemiologic Studies Short Depression Scale (CES-D 10; Radloff, 1977; Appendix H) is a 10-item, self-report instrument that measures participants’ perceived levels of depression. Sample items include, “I had trouble keeping my mind on what I was doing,” and “My sleep was restless.” Participants rate each item on a 4-point scale ranging from “Rarely or none of the time” (less than 1 day per week) to “All of the time” (5-7 days per week). Total scores are calculated by adding all of the responses together. Higher scores indicate a greater level of depression.

With regard to psychometrics, scores on the CES-D 10 exhibit high (Cohen et al., 2002) internal consistency (.81 to .86; Björgvinsson, Kertz, Bigda-Peyton, McCoy, Aderka, 2013). Cronbach’s alpha for scores using the present sample was .78. Validity is indicated by scores on the CESD-10 being positively associated with self-reported levels of depression on additional instruments (e.g., Patient Healthcare Questionnaire 9) used to measure depression (Miller, Anton, Townson, 2008; Radloff, 1977).
**Social Support**

The Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Dahlem, Zimet, & Farley, 1988; Appendix I) is a 12-item, self-report instrument that measures participants’ levels of social support. Sample items include, “There is a special person who is around when I am in need,” and “I can count on my friends when things go wrong.” Participants rate each item on a 7-point scale ranging from 1 (very strongly disagree) to 7 (very strongly agree). Total scores are calculated by adding all of the responses together. Higher scores indicate greater levels of perceived social support.

With regard to psychometrics, scores on the MSPSS exhibit high (Cohen et al., 2002) internal consistency (.85 to .88; Zimet et al., 1988). Cronbach’s alpha for scores using the present sample was .91. Validity is indicated by scores on the MSPSS being positively associated with self-reported levels of social support on additional instruments (e.g., Self-Report Questionnaire) used to measure social support (Zimet et al., 1988).

**Risky sexual behavior**

The Sexual Behavior Questionnaire (SBQ; CDC, 2008; Appendix D) is a 6-item, self-report instrument that measures the frequency and riskiness of participants’ sexual behaviors. The SBQ also includes questions that assess problem alcohol use and illicit drug use. Because I used full measures of both problem alcohol use and illicit drug use with other measures, I decided to use the three questions of the SBQ that focus specifically on age of first sexual intercourse, number of sexual partners, and use of condoms. The first question is: “How old were you when you had sexual intercourse for the first time?” Responses are scaled as 0 = never had sex, 1 = engaged in sex at age 13 or older, 2 = engaged in sex before age 13. The second question is: “During your
life, with how many people have you had sexual intercourse?” Responses are scaled as 0 = never had sex, 1 = less than six people, 2 = 6 or more people (Douglas et al., 1997). The third question is, “The last time you had sexual intercourse, did you or your partner use a condom?” and is scaled as 0 = never had sex, 1 = condom use, 2 = no condom use. I calculated a total score by adding the responses for each of these three items. Higher scores indicate higher degree of risky sexual behavior.

In line with my decision to use the three targeted questions of the SBQ, best practices regarding the assessment of risky sexual behavior in college students are generally focused on the use of three primary behavioral elements in college students’ lives: age of first sexual intercourse, number of sexual partners, and use of condoms (Guo, Chung, Hill, Hawkins, Catalano, & Abbott, 2002; Staton, Leukefeld, Logan, Zimmerman, Lynam, Milich, Martin, McClanahan, & Clayton, 1999; Valois, Oeltmann, Waller, & Hussey, 1999). Research indicates a negative association between first age of sexual intercourse and health problems (i.e., HIV/AIDS, HPV, chlamydia, certain cancers, etc.), a positive association between the number of sexual partners and health problems (i.e., HIV/AIDS, HPV, chlamydia, certain cancers, etc.), and a negative association between condom use and health problems (i.e., HIV/AIDS, HPV, chlamydia, certain cancers, etc.). According to the CDC (2010), the highest predictors for risky sexual behavior include having sex at an early age, having multiple sexual partners, having sex under the influence of drugs and alcohol, and having unprotected sex.

With regard to psychometrics, scores on the original 6-item SBQ exhibit high (Cohen et al., 2002) test-retest reliability (.84 to .96; Durant & Carey, 2000). Cronbach’s alpha for scores using the present sample was .93. High scores on the SBQ are associated with greater involvement in risky sexual behavior based on studies using additional instruments (e.g., National Survey of
Sexual Attitudes and Lifestyle) used to measure risky sexual behavior (Guo et al., 2002; Staton et al., 1999; Valois et al., 1999).

**Illicit drug use**

The Drug Abuse Screening Test (DAST-10; Skinner, 1982; Appendix E) is a 10-item, self-report instrument that measures participants’ illicit drug use and abuse. Sample items include “Have you engaged in illegal activities in order to obtain drugs?” and “Have you ever experienced withdrawal symptoms (felt sick) when you stopped taking drugs?” and “Have you used drugs other than those used for medical reasons?” Participants rate each item on a 0 (no) to 1 (yes) scale.

With regard to psychometrics, scores on the DAST-10 exhibit high (Cohen et al., 2002) internal consistency (.92 to .95; Cocco & Carey, 1998). Cronbach’s alpha for scores using the present sample was .75. Validity is indicated by scores on the DAST-10 being positively associated with self-reported levels of illicit drug as assessed by additional measures (e.g., Drug Use Disorders Identification Test) looking at rates of drug use (Cocco & Carey, 1998)

**Alcohol use**

The Alcohol Use Disorders Identification Test (AUDIT; WHO, 2016; Appendix F) is a 10-item, self-report instrument that measures the frequency and amount of alcohol participants drink. Sample items include “How many standard drinks containing alcohol do you have on a typical day when drinking?” and “How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?” and “How often do you have six or more drinks on one occasion?” Participants rate each item on a 5-point scale ranging from 0 (never) to 4 (daily or almost daily). Higher scores indicate greater alcohol dependence and possible problem alcohol use (20-40; Babor, Higgins-Biddle, Saunders, & Monteiro, 2001; WHO, 2016).
With regard to psychometrics, scores on the AUDIT exhibit high (Cohen et al., 2002) internal consistency (.83 to .85; Daeppen, Yersin, Landry, Pecoud, & Decrey, 2000). Cronbach’s alpha for scores using the present sample was .80. Validity is indicated by scores on the AUDIT being positively associated with problem alcohol use as assessed by additional instruments (e.g., the Alcohol-Related Disorders subscale of the CAGE) used to measure problem alcohol use (Babor et al., 2001; Hildebrand & Noteborn, 2015).

Disordered eating

The Dutch Eating Behavior Questionnaire (DEBQ; Van Strien, Frijters, Bergers, & Defares, 1986; Appendix G) is a 33-item, self-report instrument that measures participants’ restrained, emotional, and external patterns of eating. Restrained eating is defined as the reduction of caloric intake in order to achieve a goal related to appearance or performance and is often tied to societal pressures and internalized messages (Van Strien et al., 1986). Emotional eating is defined as the consumption of food in response to internal, emotional states such as fear, anxiety, and anger (Van Strien et al., 1986). External eating is defined as the consumption or restriction of food in response to external food-related stimuli, such as advertisements and social gatherings, regardless of whether feelings of hunger or fullness exist (Van Strien et al., 1986).

For the current study, I used the Restrained Subscale, as it was most relevant for the college athletes’ tendencies with disordered eating according to the NCAA (Voelker, 2016). This subscale contains 10 items. Sample items include “Do you eat less at mealtimes than you would like to eat?” and “Do you deliberately eat less in order not to become heavier?” and “Do you deliberately eat foods that are slimming?” Participants rate each item on a 5-point scale ranging from 1 (never) to 5 (very often). Total scores are calculated by adding all of the responses together. Higher scores indicate a higher degree of restrained eating.
With regard to psychometrics, scores on the DEBQ Restrained Subscale exhibit high internal consistency (.93 to .95, Van Strien et al., 1986). Cronbach’s alpha for scores using the present sample was .78. Validity is indicated by scores on the DEBQ Restrained Subscale being positively associated with restrained behaviors of food consumption based on additional instruments (e.g., Eating Disorders Inventory-2) used to measure disordered eating (Van Strien et al., 1986).

Procedure

After exemption was granted from IRB, I recruited participants using two methods. I (a) emailed a random sampling of undergraduate students at Purdue University via the registrar’s office, and (b) employed snowballing by personally contacting coaches and trainers at Purdue University and encouraging those coaches to discuss the study with their players. With regard to the first method, the Office of the Registrar used Webserv to obtain a random sample of 3000 undergraduate students. I supplied them with the recruitment email (Appendix H). This recruitment email briefly described the study and its purpose and potential benefits. Additionally, the recruitment email contained the link to the survey. Personnel within Purdue’s Office of the Registrar sent the recruitment email to a random sample of Purdue University undergraduate students. One week after the initial recruitment email, personnel from the Office of the Registrar sent a follow-up email (Appendix I) to the same students. With regard to the second method, I contacted coaches at Purdue University, described the purpose and potential benefits of this study, and invited the coaches to send a recruitment email (Appendix J) to their team’s respective athletes with a web-link to the survey, in addition to sending a follow-up email (Appendix K) to those coaches. I developed the online survey using Qualtrics Survey Software.
In order to meet the inclusion criteria for this study, the participants were undergraduate students between the ages of 18-25 years. Furthermore, the participants were assessed regarding their involvement in a sport on campus at either the varsity, club, or intramural level, although sport participation was not a requirement.

If students chose to participate in the study and entered the survey via the provided web-link, they were presented with an information letter (Appendix L). The information letter included the purpose and confidentiality of this study. Additionally, the information letter included the potential risks and benefits of the study and the voluntary nature of participation for the study. After reading through the information letter, the participants selected between two buttons: one that read “I agree to participate in this study” and the other that read “I do not agree to participate in this study.” Those who agreed began the survey. Those who did not agree were sent directly to the drawing page (Appendix M). At any point during the survey, participants could opt out by clicking an exit button at the bottom of each page in the survey. This button at the bottom of each survey page ensured that the participants could discontinue taking the survey at any time they chose.

If students willingly chose to participate in the survey, they began by completing the demographic questionnaire. Next, the quantitative measures were presented for completion. The AIMS, modified AIMS, modified SBQ, DAST-10, AUDIT, and DEBQ measures were presented in that order. Whether or not the survey was completed, participants were given the option to take part in a drawing for one of four $25 Amazon gift cards. This option was made available either after the survey was completed or when the participants chose to exit the survey. Making the incentive available to participants who completed or did not complete the survey diminished the likelihood that participants felt pressured to complete the survey. When participants chose to take
part in the drawing for one of the four $25 Amazon gift cards, they were directed to a separate Qualtrics survey (Appendix N) where they entered their email addresses only. The email addresses of the students who took part in the $25 Amazon gift card drawing were not linked to their respective responses in the survey. This approach ensured confidentiality of the participants.

Throughout the data collection process, the confidentiality of the participants was protected in multiple ways. Because the survey was available online, participants could take the survey in a private location to ensure no one else was able to see the information submitted. Furthermore, because the survey was structured to be taken anonymously, participants were never asked their names or other potentially-identifying information on the survey. Regarding the incentive (i.e., the Amazon gift card drawing), the email addresses were not linked with the participants’ survey responses. All data gathered from this survey were stored on a secure computer, which was password-protected. The data were accessible only by me, my advisor, and Purdue University’s IRB.
CHAPTER 4. RESULTS

In this chapter, I provide the results of the data analyses. First, I describe how I cleaned and screened the data and then how I conducted the preliminary analyses. Second, I detail the results of the primary analyses I used to address the research questions and to test the respective hypotheses. I used IBM SPSS Version 23 (SPSS 23.0; IBM Corp., 2015) for all analyses.

Data Screening and Preliminary Analyses

Per Tabachnick and Fidell’s (2013) recommendations, I completed data screening procedures and preliminary analyses. Of the 7,000 students who received my survey from Purdue’s Office of the Registrar, 558 (8%) responded. Of the 445 student athletes who received my survey from Purdue’s Athletics Department, 31 (7%) responded. The combined original data set (i.e., students and student-athletes) included 589 participants. I first examined the data set to determine if the values correctly corresponded with the Qualtrics survey. I found no discrepancies when comparing the Qualtrics survey and the SPSS data set. Second, I examined the data set to ensure the inclusion criteria (i.e., between ages 18-25 and an undergraduate student) were met. Six people were graduate students, so I deleted their data from further consideration (n = 566). Third, I removed the data of any participants who did not complete the survey. I deleted 17 people because they had not completed any part of the survey (n = 572). I removed the data for an additional 25 participants who had not completed one or more entire measures (n = 547).

I then conducted screening analyses to determine whether patterns existed in the remaining missing data. Using the Little’s MCAR test, I examined the responses to each primary measure in order to determine whether missing data could be replaced. The Little’s MCAR test was not
significant \((p = .76)\), which indicated the data were missing. Next, I imputed values for the missing data using the linear trend at point option in SPSS.

I then used boxplots to inspect the data for extreme outliers, both univariate and multivariate. I found four cases for the DAST-10 (i.e., measurement of drug use) that were extreme, and I removed them from the data set. I found two cases for the MSPSS (i.e., measurement of perceived level of social support), and I removed them from the data set. Regarding multivariate outliers, I used Mahalanobis Distance and the cumulative chi square function to calculate if there were any multivariate outliers and determined that there were none. Thus, the final sample for my study was \(n = 541\).

In order to ensure the assumptions of the statistical analyses were met, I examined the data for normal distribution and linearity. To determine normality of distribution, I examined the main variables for levels of skewness and kurtosis. According to Pallant (2010), acceptable range for skewness and kurtosis is -2.58 to +2.58. I divided the skew ratio by the standard error of skewness, per Tabachnick and Fidell (2012). All of the variables fell within the acceptable range for skewness and kurtosis. Next, in order to assess linearity, I examined Q-plots (i.e., both normal and detrended plots) using a series of regressions. The results indicated that the primary independent variables of my study were linearly related to my four dependent variables.

Next, I examined the data for normal homoscedasticity and multicollinearity. Regarding homoscedasticity, I created a new variable by saving the residual values of my primary variables regressed onto my dependent variables. Then I examined the patterns of the plotted residual values, and those plots did not indicate any discernable patterns. Regarding multicollinearity, I used the Tabachnik and Fidell (2013) rule that correlations exceeding \(r = .85\) are indicative of
multicollinearity. Because the correlations for all of my primary variables were below .85 (see Table 1) my data set has a low likelihood of containing multicollinearity.

Upon completing the dating screening procedures, I calculated descriptive statistics (i.e., means, modes, standard deviations, minimum scores, and maximum scores; Table 2), as well as Cronbach alpha coefficients for scores for the primary variables. Cronbach alpha coefficients for academic identity (.84), illicit drug use (.75), problem alcohol use (.80), disordered eating (.78), depression (.78) and social support (.91) were all above the acceptable range (.70; Tabachnick & Fidell, 2013). Athletic identity, however, fell below the acceptable range with a Cronbach alpha coefficient of .58. According to Weir (2005), in instances where Cronbach alpha falls below .60, intraclass correlation may be used to further assess a measure’s internal consistency. I performed an intraclass correlation via SPSS, and the score for the Athletic Identity measure indicated fair reliability (.58; Weir, 2005). According to Weir (2005), scores at this level may be used with caution. Please refer to Appendix Q for further information on the other strategies I used to try to improve the Cronbach alpha before using intraclass correlation.

In order to determine the possible associations between my primary variables and the continuous background variables, I performed correlations (see Table 1) among the eight primary variables and three continuous background variables (i.e., age, BMI, GPA). In addition, I computed these correlations for both the whole sample and the athlete-only subsample. Injury and illness severity were continuous variables only completed by those participants who had experienced injury and illness, respectively. Severity of injury emerged as positively associated with disordered eating, but because all participants did not complete this item and because the significance was below .01, I did not control for this variable. However, I was mindful of this
finding when interpreting the results. Severity of illness was not associated with any of the primary variables.

Regarding controlling for continuous variables in my primary regression analyses, I decided to consider correlations that were at or below .01 significance value as representing substantive association (Cohen, 1988). In addition, I considered only correlations between the background variables and my dependent variables of consideration for each research question. The correlations of focus for the overall sample were the positive correlations between age and risky sexual behavior, as well as the negative correlation between age and academic identity. Additionally, the positive correlations between BMI and both problem alcohol use and disordered eating were significant. Furthermore, within the overall sample, the positive correlation between GPA and academic identity, as well as the negative correlations between GPA and both risky sexual behavior and problem alcohol use were significant (i.e., at or below .01; see Table 1). For the athlete-only group, the correlations of focus were the positive correlation between age and risky sexual behavior, as well as the positive correlation between BMI and athletic identity and problem alcohol use, and also the negative correlation between GPA and problem alcohol use.

Therefore, in summary, I controlled for BMI, age, and GPA in RQ1 for the overall sample. I controlled only for BMI in RQ2 for the athlete-only group because BMI was the only variable significantly correlated with athletic identity. In the regressions for RQ3 and RQ4 (i.e., athlete-only group), I controlled for age with risky sexual behavior, and I also controlled for BMI and GPA with problem alcohol use.
Table 4.

Summary of Bivariate Correlations for the Whole Sample and Athlete-Only Sample among Non-Transformed and Transformed Primary Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
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<td>1. Age</td>
<td>-</td>
<td>.04</td>
<td>.07</td>
<td>-.06</td>
<td>-.13</td>
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<td>-.14</td>
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<td>.06</td>
</tr>
<tr>
<td>2. BMI</td>
<td>.08</td>
<td>-</td>
<td>.21**</td>
<td>.16**</td>
<td>-.09</td>
<td>-.02</td>
<td>.03</td>
<td>.19**</td>
<td>.12</td>
<td>.04</td>
<td>.01</td>
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<tr>
<td>3. Cumulative GPA</td>
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<td>-.29**</td>
<td>-</td>
<td>-.03</td>
<td>.19*</td>
<td>-.18</td>
<td>-.03</td>
<td>-.25**</td>
<td>.00</td>
<td>-.09</td>
<td>-.00</td>
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<tr>
<td>4. Athletic Identity***</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-.03</td>
<td>-.03</td>
<td>.08</td>
<td>-.03</td>
<td>.14</td>
<td>.02</td>
<td>.14</td>
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<td>5. Academic Identity</td>
<td>-.15**</td>
<td>-.09*</td>
<td>.22**</td>
<td>-</td>
<td>-</td>
<td>.03</td>
<td>.04</td>
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<td>.14</td>
<td>-.04</td>
<td>.03</td>
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<td>6. Risky Sexual Behavior</td>
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<td>.03</td>
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<td>-</td>
<td>-.06</td>
<td>-</td>
<td>.17*</td>
<td>.34**</td>
<td>.08</td>
<td>.13</td>
<td>.01</td>
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<td>7. Illicit Drug Use</td>
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<td>-.07</td>
<td>-</td>
<td>.06</td>
<td>.22**</td>
<td>-</td>
<td>.21**</td>
<td>-.04</td>
<td>.16*</td>
<td>-.01</td>
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<td>8. Problem Alcohol Use</td>
<td>.22*</td>
<td>.12**</td>
<td>-.19**</td>
<td>-</td>
<td>-.07</td>
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<td>.25**</td>
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<td>.05</td>
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<td>.02</td>
<td>.11**</td>
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<td>.16**</td>
<td>-</td>
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<td>.01</td>
<td>.08</td>
<td>.02</td>
<td>-.27**</td>
<td>-</td>
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</tbody>
</table>

* = p < .05; ** = p < .01; ***taken only by athlete-only sample

Note: top numbers refer to the athlete-only sample (n = 154), and the bottom numbers refer to entire sample (n = 541)
Next, I assessed the degree to which the primary variables differed based on the categorical demographic variables in my study. More specifically, I conducted a series of one-way multivariate analysis of variance (MANOVA) tests to determine the degree to which the scores on the eight primary variables (i.e., athletic identity, academic identity, risky sexual behavior, illicit drug use, problem alcohol use, disordered eating, depression, and social support) varied as a function of the categorical demographic variables (i.e., sex, race, international status, year in college, sexual orientation, current student status, and current relationship status). Regarding effect size, I used the univariate level effect sizes in order to determine which variables needed to be controlled for in my primary analyses. According to Cohen et al., (2002), a small effect size is at least .01, medium effect size is at least .09, and large effect size is at least .25. I decided to control for variables only if they had at least a medium effect size in connection with a primary variable. As with the correlations, I reviewed the results for both the overall sample (i.e., athletes and non-athletes), and for the athlete-only subsample.

Based on the findings indicated in Appendix R (see p. 161), I used a dichotomized version of current relationship status (i.e., 0 = all other statuses and 1 = married/partnered/cohabitating) in my MANCOVA to address RQ1. In addition, I used the same dichotomized version of current relationship status in my regressions for risky sexual behavior and illicit drug use (i.e., RQ3 & RQ4).

As a general summary, the covariates for the MANCOVA to address RQ1 were BMI, age, GPA, and relationship status. The covariate for the ANCOVA to address RQ2 was BMI. Regarding RQ3 and RQ4, I controlled for age and relationship status in the regression for risky sexual behavior. I controlled for relationship status in the regression for illicit drug use. And finally, I controlled for BMI and GPA in the regression for problem alcohol use.
Table 5.

*Description of Primary Continuous Variables*

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<tr>
<th>Variable</th>
<th>n</th>
<th>Mean</th>
<th>Median</th>
<th>Standard Deviation</th>
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<th>Maximum Score</th>
<th>Possible Range</th>
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<td>23.59</td>
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<td>16-53</td>
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<td>3. Current GPA</td>
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<td>.5-4</td>
<td>-</td>
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<td>5. Academic ID</td>
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<td>47.00</td>
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<td>9.00</td>
<td>63.00</td>
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<td>10.00</td>
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<td>10-49</td>
<td>.78</td>
</tr>
</tbody>
</table>

*Only completed by intramural, club, or Division I levels*
**Primary Analyses**

My first research question was focused on whether problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating), depression, and social support varied based on injury/illness status (i.e., injury/illness or no injury/illness) or athletic involvement (i.e., non-athlete, intramural/club, Division I). I addressed this research question and tested the associated hypotheses through performing a MANCOVA. My second research question was focused on whether college athletes’ athletic identity adherence varied based on athletic level (i.e., intramural/club, Division I) or injury/illness status (i.e., injury/illness or no injury/illness). I addressed this research question and tested the associated hypothesis through performing an ANCOVA. My third research question was focused on whether injury status, levels of identity adherence (i.e., academic and athletic identity adherence), depression, and social support contributed to problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating) for college athletes. My fourth research question was focused on whether college athletes’ adherence to their athletic and academic identities, depression, and social support moderated the relationship between injury/illness status (i.e., injury/illness or no injury/illness) and engagement in problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating). To answer both RQ3 and RQ4, I performed a total of four regressions that corresponded to my four dependent variables (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating). In general, I used the first step of the regressions for the control variables (i.e., for the risky sexual behavior, illicit drug use, and problem alcohol use regressions), the second step to answer RQ3, and the third step to answer RQ4. For the disordered eating regression, because there was no control variable, I used the first step to answer RQ2, and the second step to answer RQ3.
Based on a power analysis within SPSS with .80 power and alpha set at .05, with a small
to medium effect size (.08), the power to detect significant effects was moderate for the ANCOVA
analysis (i.e., .56) and high for the MANCOVA analysis (.96; Cohen et al., 2002). Based on a
power analysis (Soper, 2016) containing 12 predictors with .80 power and .05 alpha level, I
calculated the power for each regression analyses. Because I ran four separate regressions, I
divided the probability by 4. This practice enabled me to correctly calculate the significance and
reduce Type 1 error in order to meet the assumptions for regression. Regarding the regressions in
this study, the power to explain significant variation in risky sexual behavior was low (i.e., .39),
moderate for illicit drug use (i.e., .55), low for problem alcohol use (i.e., .39), and moderate to high
for disordered eating (.60; Cohen et al., 2002). These low effect statistics are most likely due to
the low number (i.e., 27) of participants in the Division I group.

Problem behaviors, depression, social support, injury/illness status, and athletic involvement
(i.e., non-athlete, intramural/club, Division I)

RQ1 was focused on possible group differences in the primary variables based on
injury/illness status and athletic involvement. I addressed this research question and tested the
associated hypotheses through performing a MANCOVA. More specifically, I used injury/illness
status and athletic involvement as my independent variables and problem behaviors (i.e., risky
sexual behavior, illicit drug use, problem alcohol use, and disordered eating), depression and social
support as my dependent variables. Based on results from my preliminary analyses, I entered the
variables of relationship status (i.e., all other statuses versus married/partnered/cohabitating), BMI,
age, and GPA as my covariates.

The findings indicated there was not a main effect for injury/illness status, $F(6, 512) = .88,
p = .51$, partial $\eta^2 = .01$, or an interaction effect between athletic involvement and injury/illness
status, $F(12, 1024) = 1.23, p = .26$, partial $\eta^2 = .01$. However, there was a significant main effect for athletic involvement, $F(12, 1024) = 3.89, p = .00$, partial $\eta^2 = .04$ for the six variables as a set. Univariate findings indicated a difference based on athletic involvement for illicit drug use, $F(2, 517) = 3.11, p = .05$, partial $\eta^2 = .01$. Post hoc analyses indicated that the intramural/club group ($M = 13.22$) scored significantly higher for illicit drug use than did the non-athlete ($M = 11.05, SD = .17$) and the Division I ($M = 10.75, SD = .47$) groups. In addition, the non-athlete ($M = 11.05, SD = .17$) group scored significantly higher than the Division I group ($M = 10.75, SD = .47$) for illicit drug use. Univariate findings also indicated a difference based on problem alcohol use, $F(2, 517) = 11.27, p = .00$, partial $\eta^2 = .04$. Additionally, post hoc analyses indicated that the intramural/club group ($M = 14.09$) scored significantly higher for problem alcohol use than did the non-athlete ($M = 12.19, SD = .24$) and the Division I ($M = 12.04, SD = .73$) groups.

My hypotheses associated with RQ1 were not supported. I hypothesized that college students (i.e., athletes and non-athletes) who had an injury and/or illness would engage in problem behaviors to a higher degree than college students (i.e., athletes and non-athletes) with no injury or illness (H1a). I also hypothesized that college students who had an injury and/or illness would experience higher depression and lower social support than college students with no injury or illness (H1b). Although not connected to my hypotheses, significant group differences based on athletic involvement did emerge. Specifically, the intramural/club group scored significantly higher than the non-athlete and Division I group on illicit drug use and problem alcohol use. In addition, the non-athlete group scored significantly higher than the Division I group on illicit drug use.
Table 6.

*Injury/Illness Status, Athletic involvement, and Primary Variables*

<table>
<thead>
<tr>
<th></th>
<th>Non-Injured/Ill</th>
<th>Injured/Ill</th>
</tr>
</thead>
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<tr>
<td></td>
<td>$n = 412$</td>
<td>$n = 129$</td>
</tr>
<tr>
<td></td>
<td><strong>Non-Athlete</strong></td>
<td><strong>Intramural &amp; Club</strong></td>
</tr>
<tr>
<td></td>
<td><strong>$M$</strong></td>
<td><strong>SD</strong></td>
</tr>
<tr>
<td>Academic Identity</td>
<td>47.21</td>
<td>9.11</td>
</tr>
<tr>
<td>Depression</td>
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</tr>
<tr>
<td>Social Support</td>
<td>49.24</td>
<td>10.32</td>
</tr>
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<td>Risky Sexual Behavior</td>
<td>5.02</td>
<td>1.76</td>
</tr>
<tr>
<td>Illicit Drug Use</td>
<td>11.11</td>
<td>.84</td>
</tr>
</tbody>
</table>
College athletes’ athletic identity adherence, athletic level, and injury/illness status of college athletes

RQ2 was focused on whether college athletes’ athletic identity adherence varied based on injury/illness status or athletic level (i.e., intramural/club, Division I). I addressed this research question and tested the associated hypotheses through performing an ANCOVA with BMI as my covariate. I only used athletes in this analysis. More specifically, athletic level and injury/illness status were my independent variables, and athletic identity adherence was my dependent variable.

The overall findings indicated there was not a significant main effect for injury/illness status, $F(1, 287) = .001, p = .97$, partial $\eta^2 = .00$ or a significant interaction effect between injury/illness status and athletic level, $F(1, 146) = .73, p = .39$, partial $\eta^2 = .01$. However, there was a significant main effect for athletic level, $F(1, 154) = 3.78, p = .05$, partial $\eta^2 = .02$. More specifically, Division I athletes ($M = 53.36, SD = 2.85$) reported higher levels of adherence to their athletic identity than did intramural/club athletes ($M = 47.21, SD = 1.37$).

My hypothesis associated with RQ2 was not supported. With H2a, I hypothesized that college athletes who had an injury and/or illness would adhere more to their athletic identities than athletes with no injury/illness. Although not connected to my hypothesis, a significant difference based on athletic level did emerge, with Division I athletes reporting higher levels of adherence to their athletic identity than intramural/club athletes.

College athletes’ adherence to their athletic and academic identities, depression, social support, injury/illness status, and engagement in problem behaviors

To answer both RQ3 and RQ4, I used a series of four regressions corresponding to my four dependent variables (i.e., problem behaviors). RQ3 was focused on whether injury status, levels of identity adherence, depression, and social support contributed to problem behaviors for college athletes. In step 1 for the risky sexual behavior regression, I entered relationship status (i.e., 0 =
all other statuses and 1 = married/partnered/cohabiting) and age. In step 1 for the illicit drug use regression, I entered relationship status. In step 1 of the problem alcohol use regression, I entered BMI and GPA. In step 2 for the risky sexual behavior, problem alcohol use, and illicit drug use regressions, I entered all my primary independent variables (i.e., athletic and academic identity adherence, depression, and social support). For the disordered eating regression, the primary variables were entered in step 1.

RQ4 was focused on whether college athletes’ adherence to their athletic and academic identities, depression, and social support moderated the relationship between injury/illness status and engagement in problem behaviors. In order to address this research question, I added a third step to the risky sexual behavior, illicit drug use, and problem alcohol use regressions and a second step to the disordered eating regression. In step 3 for risky sexual behavior, illicit drug use, and problem alcohol use, and step 2 for illicit drug use and disordered eating, I entered five interaction terms (i.e., injury/illness status x athletic identity, injury/illness status x academic identity, injury/illness status x depression, injury/illness status x social support, and injury/illness status x athletic level). I have organized the findings based on each of the dependent variables.

**Risky Sexual Behavior**

With regard to risky sexual behavior, R was significantly different from zero at the end of steps 1 and 3. After step 3, with all IVs and interaction terms in the equation, $R^2 = .20$, $F (5, 140) = 3.48$, $p = .01$. After step 1, with relationship status (0 = all other statuses and 1 = married/partnered/cohabitating) and age added to the equation, $R^2 = .08$, $F (2, 151) = 6.40$, $p = .00$. Relationship status emerged as a significant positive predictor of risky sexual behavior, with the married/partnered/cohabitating group reporting higher rates of risky sexual behavior. Age also emerged as a significant positive predictor of risky sexual behavior, with older participants reporting higher rates of risky sexual behavior. After step 2, with injury/illness status, depression
and social support, and identity variables added to the equation, $R^2 = .10$, $F (8, 145) = 1.92, p = .07$, and $\Delta R^2 = .02, F (6, 145) = .47, p = .83$ (RQ3). The addition of the individual primary variables did not add to the prediction of risky sexual behavior. After step 3, with the addition of the interaction terms between injury/illness status, depression and social support, and the identity variables, $\Delta R^2 = .10, F (13, 140) = 2.62, p = .00$ (RQ4). The addition of the interaction terms added to the prediction of risky sexual behavior. More specifically for step 3, injury/illness status, the injury/illness status x athletic level interaction, the injury/illness status x social support interaction, and the injury/illness status x athletic identity interaction were significant predictors of risky sexual behavior. Injury/illness status emerged as a significant positive predictor of risky sexual behavior in that injured athletes were more likely than non-injured athletes to engage in risky sexual behavior.

In order to further analyze the significant interactions, I used PROCESS v3.0 (Hayes, 2018), a macro within SPSS, to determine the specific directions within and between the interactions and moderator variables. As displayed in Figure 1, the positive association between injury/illness status and risky sexual behavior emerged for Division I athletes ($b = 1.75, p = .02$), but not for their intramural/club peers ($b = -.002, p = .99$). Using a confidence interval of 95%, injured Division I athletes were 3.35 times more likely to engage in risky sexual behavior than non-injured Division I athletes. The Johnson-Neyman technique to determine the transition point of the interaction effect does not apply in this case, as athletic level is a dichotomized variable. It is important to note that this finding was not connected to my hypotheses for RQ4.
As displayed in Figure 2, the association between risky sexual behavior and athletic identity was significant at the left side (i.e., no reported injury/illness; $b = 1.20$, $t = 2.74$, $p = .01$) but not significant at right side (i.e., reported injury/illness; $b = .92$, $t = -.73$, $p = .47$). The results of the Johnson-Neyman technique indicated that the transition point of the interaction effect was about one third of a standard deviation below the mean of athletic identity ($t = 1.98$, $p = .05$). The figure indicates that if non-injured/ill athletes had high athletic identity, they were more apt to participate in risky sexual behavior than were their peers with low athletic identity. In contrast, athletic identity was not related to risky sexual behavior for injured/ill athletes.
As displayed in Figure 3, the association between risky sexual behavior and social support was significant with no reported injury/illness ($b = 1.31, t = 2.11, p = .04$) but was not significant with reported injury/illness ($b = 1.01, t = -.21, p = .83$). The results of the Johnson-Neyman technique indicated that the transition point of the interaction effect was about one third of a standard deviation below the mean of social support ($t = 1.98, p = .05$). The figure illustrates that non-injured/ill athletes with low social support were more likely to engage in risky sexual behavior than their non-injured/ill peers with high social support. In contrast, social support was not related to risky sexual behavior for the injured/ill group.

Figure 4. *Risky Sexual Behavior, Injury/Illness Status, and Athletic Identity* ($n = 154$)
Illicit drug use

With regard to illicit drug use, if was significantly different from zero at the end step 1 of the regression. After step 3, with all IVs and interaction terms in the equation, $R^2 = .09, F(4, 142) = .09, p = .99$. After step 1, with relationship status ($0 = \text{all other statuses and } 1 = \text{married/partnered/cohabitating}$) added to the equation, $R^2 = .08, F(1, 152) = .98, p = .05$. Relationship status emerged as a significant positive predictor of illicit drug use, with the married/partnered/cohabitating group reporting higher rates of illicit drug use. After step 2, with injury/illness status, depression and social support, and identity variables added the equation, $R^2 = .09, F(7, 146) = 2.18, p = .33$, and $\Delta R^2 = .04, F(7, 146) = 2.02, p = .48$ (RQ3). The addition of the individual primary variables did not contribute to the prediction of illicit drug use. After step 3, with the addition of the interaction terms between injury/illness status, depression and social
support, athletic level, and the identity variables, $\Delta R^2 = .02, F (4, 153) = 1.28, p = .99$ (RQ4). The addition of the interaction terms did not contribute to illicit drug use.

**Problem alcohol use**

With regard to problem alcohol use, $R$ was significantly different from zero at the end of step 1. After step 3, with all IVs and interaction terms in the equation, $R^2 = .14, F (5, 141) = 1.76, p = .72$. After step 1, with BMI and GPA added to the equation, $R^2 = .04, F (2, 152) = 6.96, p = .00$. BMI emerged as a significant positive predictor of problem alcohol use, with the individuals with higher BMI reporting higher rates of problem alcohol use. GPA emerged as a significant negative predictor of problem alcohol use, with the individuals with lower GPA reporting higher rates of problem alcohol use. After step 2, with injury/illness status, depression and social support, athletic level, and identity variables added to the equation, $R^2 = .12, F (6, 146) = 1.06, p = .39$, and $\Delta R^2 = .02, F (7, 147) = 1.55, p = .16$ (RQ3). The addition of the individual primary variables did not contribute to the prediction of problem alcohol use. After step 3, with the addition of the interaction terms between injury/illness status, depression and social support, athletic level, and the identity variables, $\Delta R^2 = .02, F (5, 141) = 1.76, p = .72$ (RQ4). The addition of the interaction terms did not contribute to problem alcohol use.

**Disordered eating**

With regard to disordered eating, $R$ was significantly different from zero at the end of step 1 of the regression. After step 2, with all IVs and interaction terms in the equation, $R^2 = .16, F (5, 143) = .62, p = .68$. After step 1, with injury/illness status, depression and social support, athletic level, and identity variables added to the equation, $R^2 = .14, F (6, 148) = 4.14, p = .001$ (RQ3). Specifically, depression emerged as positively contributing to the variance of disordered eating. After step 2, with the addition of the interaction terms between injury/illness status, depression
and social support, and the identity variables, $\Delta R^2 = .02$, $F (11, 143) = 2.51$, $p = .06$ (RQ4). The addition of the interaction terms did *not* contribute to the prediction of disordered eating.
Table 7.

**Predictors of Problem Behaviors**

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<th>Variable</th>
<th>SBQ: Risky Sexual Behavior</th>
<th>DAST: Illicit Drug Use</th>
<th>AUDIT: Problem Alcohol Use</th>
<th>DEBQ: Disordered Eating</th>
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<tr>
<td></td>
<td><strong>B</strong></td>
<td><strong>SE</strong></td>
<td><strong>β</strong></td>
<td><strong>ra(b.c)</strong></td>
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<td>.19*</td>
<td>.20</td>
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<td>---</td>
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<td>---</td>
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<td>.01</td>
<td>-0.04</td>
<td>-0.04</td>
</tr>
</tbody>
</table>

(Table 7 continues)
|                                | .88 | .73 | .10 | .10 | .53 | .37 | .13 | .12 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|--------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| **BMI**                        | --- | --- | --- | --- | --- | --- | --- | --- | --- | .22 | .10 | .19 | .18 | --- | --- | --- | --- | --- | --- |
| **Age**                        | .30 | .11 | .20 | .21 | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **GPA**                        | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Injury/Illness Status**      | 1.79| .77 | .48*| .19 | .10 | .37 | .05 | .02 | .14 | 1.70| .02 | .01 | -4.95| 3.65| -2.6 | -1.1 | --- | --- | --- |
| **Athletic Level**             | 1.01| .65 | .21 | .13 | .44 | .31 | .19 | .12 | 2.26| 1.44| .22 | .13 | .05  | 3.09 | .002| .001| --- | --- | --- |
| **Depression**                 | -.03| .05 | -.08| -.06| .03 | .02 | .16 | .11 | -.06| -.11| -.07| -.05 | .62  | .23  | .33**| .22 | --- | --- | --- |
| **Social Support**             | -.05| .03 | -.21| -.15| .01 | .01 | .06 | .04 | -.06| .06 | -.13| -.08 | .19  | .14  | .17  | .12 | --- | --- | --- |
| **Academic Identity**          | .004| .02 | .02 | .02 | .004| .01 | .04 | .03 | .04 | .05 | .10 | .07  | .23  | .10  | .25* | .19 | --- | --- | --- |
| **Athletic Identity**          | .02 | .01 | .15 | .13 | .004| .01 | .07 | .06 | .01 | .01 | .32 | .02  | .02  | .08  | .06  | .12 | --- | --- | --- |
| **Injury/Illness Status X Athletic Level** | -1.81| .85 | -.43*| -.18| .09 | .41 | .04 | .02 | -.07| 1.88| -.01| -.003| 3.40 | 4.03 | .16 | .07 | --- | --- | --- |
| **Injury/Illness Status X Depression** | .11 | .06 | .20 | .14 | .001| .03 | .004| .003| .15 | .15 | .13 | .09  | -.03 | .31  | -.01 | -.01| --- | --- | --- |
| **Injury/Illness Status X Social Support** | .08 | .04 | .24*| .17 | -.01| .02 | -.04| -.03| .13 | .09 | .18 | .13  | -.002| .19  | -.001| -.001| --- | --- | --- |
| **Injury/Illness Status X Academic Identity** | .01 | .03 | .05 | .03 | -.01| .02 | -.04| -.03| -.09| .07 | -.15| -.11 | -.24 | .15  | -.18 | -.13| --- | --- | --- |
| **Injury/Illness Status X Athletic Identity** | -.07| .02 | -.30**| -.25| .01 | .01 | .05 | .04 | .000| .005| .001| .000 | .005 | .11  | .05  | .04 | --- | --- | --- |

*Note. N = 225. \( r(a,b,c) \) = semipartial correlation coefficient. SBQ = Sexual Behavior Questionnaire. DAST-10 = Drug Abuse Screening Test. AUDIT = Alcohol Use Disorders Identification Test. DEBQ = Dutch Eating Behavior Questionnaire.

\*p < .05. **p < .01. ***p < .001.
There was mixed support for the hypotheses associated with RQ3. More specifically, injury/illness status emerged as positively contributing to risky sexual behavior (H3a), and depression emerged as positively contributing to disordered eating (H3d). However, the findings did not indicate support for relationships between athletic identity (H3b), academic identity (H3c), or social support (H3e) and any of the problem behaviors. Although not connected with my hypotheses, relationship status and age emerged as significant contributors to risky sexual behavior, relationship status emerged as a significant contributor to illicit drug use, BMI and GPA emerged as significant contributors to problem alcohol use, and depression emerged as a significant contributor to disordered eating (see Table 7, p. 82).

My hypotheses associated with RQ4 were not supported. Although athletic identity (H4a) and social support (H4d) emerged as moderators of the positive relationship between injury/illness status and risky sexual behavior, the moderation effects were not in the expected directions. I expected that athletic identity (H4a), academic identity (H4b), and depression (H4c) would all moderate the relationship between injury/illness, such that the positive relationship between injury/illness and problem behaviors would decrease as athletic and academic identities, and depression, decreased. I expected that social support (H4d) would moderate the relationship between injury/illness, such that the positive relationship between injury/illness and problem behaviors would decrease as social support increased. Instead, athletic identity (H4a) and social support (H4d) emerged as significant moderators with risky sexual behavior, but not in the direction I expected. More specifically, the data indicated non-injured/ill athletes with high athletic identity were more apt to participate in risky sexual behavior than were their non-injured/ill peers with low athletic identity, and athletic identity was not related to risky sexual behavior for injured/ill athletes. Additionally, the data indicated non-injured/ill athletes with low social support
are more likely to engage in risky sexual behavior than their non-injured/ill peers with high social support. In contrast, social support was not related to risky sexual behavior for the injured/ill group.

Table 8.

Summary of Hypotheses Testing

<table>
<thead>
<tr>
<th>Hypothesis #</th>
<th>Hypothesis</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>College students (athletes and non-athletes) who have an injury and/or illness will participate in problem behaviors to a higher degree than college students (athletes and non-athletes) with no injury or illness.</td>
<td>Not Supported</td>
</tr>
<tr>
<td>1b</td>
<td>College students (athletes and non-athletes) who have an injury and/or illness will experience higher depression and lower social support than college students (athletes and non-athletes) with no injury or illness.</td>
<td>Not Supported</td>
</tr>
<tr>
<td>2a</td>
<td>College athletes who have an injury and/or illness will adhere more to their athletic identities than athletes with no injury and/or illness.</td>
<td>Not Supported</td>
</tr>
<tr>
<td>3a</td>
<td>Injury/Illness status will have a positive relationship with all of the problem behaviors, so that if individuals have an injury and/or illness, they will be more likely to engage in problem behaviors.</td>
<td>Partially Supported</td>
</tr>
<tr>
<td>3b</td>
<td>Athletic identity will have a negative relationship with all of the problem behaviors.</td>
<td>Not Supported</td>
</tr>
<tr>
<td>3c</td>
<td>Academic identity will have a negative relationship with all of the problem behaviors.</td>
<td>Not Supported</td>
</tr>
<tr>
<td>3d</td>
<td>Depression will have a positive relationship with all of the problem behaviors.</td>
<td>PartiallySupported</td>
</tr>
<tr>
<td>3e</td>
<td>Social support will have a negative relationship with all of the problem behaviors.</td>
<td>Not Supported</td>
</tr>
<tr>
<td>4a</td>
<td>Athletic identity will moderate the relationship between injury and/or illness such that the positive relationship between injury and/or illness and problem behaviors will decrease as athletic identity decreases.</td>
<td>Not Supported</td>
</tr>
<tr>
<td></td>
<td>Hypothesis</td>
<td>Support</td>
</tr>
<tr>
<td>---</td>
<td>----------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>---------</td>
</tr>
<tr>
<td>4b</td>
<td>Academic identity will moderate the relationship between injury and/or illness and problem behaviors will decrease as academic identity decreases.</td>
<td>Not Supported</td>
</tr>
<tr>
<td>4c</td>
<td>Depression will moderate the relationship between injury and/or illness, such that the positive relationship between injury and/or illness and problem behaviors will decrease as depression decreases.</td>
<td>Not Supported</td>
</tr>
<tr>
<td>4d</td>
<td>Social support will moderate the relationship between injury and/or illness, such that the positive relationship between injury and/or illness and problem behaviors will decrease as social support increases.</td>
<td>Not Supported</td>
</tr>
</tbody>
</table>
CHAPTER 5. DISCUSSION

The first purpose of this study was to determine whether college athletes’ adherence to their athletic and academic identities varied based on injury/illness status (i.e., injury/illness or no injury/illness). The second purpose was to determine whether college athletes’ problem behavior (e.g., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating) varied based on injury/illness status. The third purpose was to determine whether injury status, levels of identity adherence (i.e., academic and athletic identity adherence), depression, and social support contributed to problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating) for college athletes. The final purpose was to explore whether college athletes’ adherence to their athletic and academic identities, levels of depression, and levels of social support moderated the relationship between injury/illness status (i.e., injury/illness or no injury/illness) and engagement in problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating).

To achieve these purposes, I analyzed data from 541 college students. The students who took part in this study reported demographic information, as well as athletic involvement (i.e., non-athlete, intramural/club, Division I), athletic identity, academic identity, injury/illness status, perceived level of social support and depression, and level of participation in problem behaviors. I used MANCOVA, ANCOVA, and hierarchical multiple regression to answer four research questions associated with predictions of problem behaviors based on athletic identity, academic identity, injury/illness status, and depression and social support. The hypotheses connected with RQ1 and RQ2 were not supported. In contrast, two of the hypotheses (i.e., H3a, H3d) associated with RQ3 were partially supported. The hypotheses connected with RQ4 (i.e., H4a, H4b, H4c, and H4d) were not supported.
In this chapter, I review the results of this study. First, I offer tentative explanations of the primary findings of this study, including outcomes of the hypotheses testing. Second, I review and offer tentative explanations for the findings that were not associated with my hypotheses. Third, I provide a summary of the novel contributions of this study. Fourth, I indicate clinical implications for this study. Finally, I offer the limitations of this study and suggestions for future research.

Primary Study Findings: Hypotheses Testing

In this section, I review the outcomes of my hypotheses testing for the current study. The material is organized using the research questions as my headings, and I provide possible explanations for findings regardless of whether or not each hypothesis was supported. In each case, I provide a connection back to the past findings that led to each hypothesis and then note tentative explanations for the current findings.

Problem Behaviors, Depression, Social Support, Injury/Illness Status, and Athletic Involvement (i.e., non-athlete, Intramural/club, Division I)

For RQ1, I hypothesized that college students (i.e., athletes and non-athletes) who had an injury and/or illness would participate in problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating) to a higher degree than college students (i.e., athletes and non-athletes) with no injury or illness (H1a). I also hypothesized that college students (i.e., athletes and non-athletes) who had an injury and/or illness would report higher depression and lower social support than college students (i.e., athletes and non-athletes) with no injury/illness (H1b). These hypotheses were not supported. These findings related to RQ1 suggest that there were no differences in engagement of problem behaviors or reporting of social support or depression between college students who were injured/ill and those who were not injured/ill. In
addition, the interaction between injury/illness status and athletic involvement did not emerge as significant.

The lack of difference in problem behaviors, social support and depression indicates that injury/illness experiences may simply not have an effect on these variables. Furthermore, based on the premise that injury/illness was a threat to identity, previous research has indicated that problem behaviors would be higher for injured/ill individuals than those without these conditions (Ashforth, 2001; De Leo & Wulfert, 2013, Vazsonyi et al., 2010; Gecas, 1982; Jessor, 2014; Mobley & Chun, 2013; Petriglieri, 2011; Stryker and Burke, 2000; Tajfel & Turner, 1986). It is possible that when college students and athletes get injured/ill, their behaviors are never affected due to their resilience. Rosenbaum and Weatherford (2017) argued that current college students have more avenues of coping (e.g., via posting or sharing on social media) than previous generations, which may allow for greater resilience when they encounter difficulties in college. These coping mechanisms may allow all college students, regardless of athletic involvement, to experience minimal internal (i.e., depression) or external (i.e., problem behaviors) difficulties when faced with injury or illness.

**College Athletes’ Athletic Identity Adherence, Athletic Level, and Injury/Illness Status**

For RQ2, I hypothesized that college athletes who had an injury and/or illness would adhere more to their athletic identities than athletes with no injury/illness (H2a). The hypothesis was not supported. Findings from this study related to RQ2 suggest that there is no difference between injured/ill and non-injured/ill athletes regarding their athletic identity adherence.

These findings related to RQ2 suggest that there is no difference in athletic identity adherence between injured/ill athletes and non-injured/ill athletes. This finding is somewhat surprising in that previous research suggested individuals may adhere to their identities more
strongly when their identities are threatened (Petriglieri, 2011). Perhaps injury/illness does not make a difference in terms of athletic identity. More specifically, it may be that athletic identity runs so deep for some athletes that, regardless of injury/illness status, they are still going to maintain their athletic identity at a steady level.

College Athletes’ Adherence to Their Athletic and Academic Identities, Depression, Social Support, Injury/Illness Status, and Engagement in Problem Behaviors

For RQ3, I hypothesized that college athletes who had an injury/illness would be more likely to engage in problem behaviors (H3a), that athletic identity would be negatively associated with the problem behaviors (H3b), that academic identity would be negatively associated with the problem behaviors (H3c), that depression would be positively associated with problem behaviors (H3d), and that social support would be negatively associated with problem behaviors (H3e). H3a and H3d were both partially supported. H3b and H3c were not supported.

College athletes who had an injury/illness were more likely to engage in risky sexual behavior but none of the other problem behaviors (H3a). The finding that college athletes who had an injury/illness were more likely to engage in risky sexual behavior was consistent with current literature (Chernoff & Davison, 2005; McBride, Reece, & Sanders, 2008), but it is surprising as to why the other problem behaviors did not emerge as similarly related to injury/illness as risky sexual behavior. Perhaps injury/illness is more related to risky sexual behavior than the other problem behaviors (i.e., illicit drug use, problem alcohol use, and disordered eating) because athletes perceive risky sexual behavior as having the least potential for negative consequences on their athletic performance. Additionally, risky sexual behavior, unlike illicit drug use or underage drinking, is not illegal and would not be connected with any university/college/team rules and
regulations. Subsequently, risky sexual behavior carries with it a low likelihood of getting caught and/or being punished.

Athletic identity was not negatively related to any of the problem behaviors (H3b). The data indicated that participants engaged in problem behaviors at similar rates regardless of their adherence to their identity as athletes. Perhaps athletic identity is quite separate from problem behaviors. Some literature does suggest a belief that athletes are either more or less likely to engage in problem behaviors (Hollombeak & Amorose, 2005), but the current findings indicate identity may operate separately from problem behaviors. Regardless of the level of viewing one’s self as an athlete, athletes in the current sample were not more or less likely to engage in problem behaviors. Perhaps athletes’ adherence to their athletic identity has nothing to do with problem behaviors at all. The Athletic Identity Measure (AIMS; Brewer et al., 1993) focuses mainly on the level at which individuals see themselves as athletes. Those constructs may be completely separate from engagement in problem behaviors, such that one construct does not have a relationship with the other.

Academic identity was not negatively related to any of the problem behaviors (H3c). This finding indicates there is no relationship between academic identity and problem behaviors. My hypothesis that the more individuals adhered to their academic identities, the less likely they would be to engage in problem behaviors was based on research indicating similar findings (Ashforth, 2001; Gecas, 1982; Petriglieri, 2011; Stryker, 1987; Stryker & Burke, 2000; Tajfel & Turner, 1986). Perhaps today’s college culture does not equate being a student with the absence or presence of problem behaviors. Caring a great deal about academics, identifying primarily as an academic student, and investing a great deal of time and energy into academics may not be either a buffer or a risk factor with regard to engaging in problematic behaviors.
Depression emerged as positively related to disordered eating, but not to any of the other problem behaviors (H3d). The relationship between depression and disordered eating is consistent with past research (Santos, Richards, & Bleckley, 2007). However, it is somewhat surprising that depression was not related to any of the other problem behaviors. Research using Problem Behavior Theory as a foundation has indicated positive relationships between depression and many problem behaviors, such as problem gambling, internet addiction, problem alcohol use, risky sexual behavior, and illicit drug use (De Leo & Wulfert, 2013; Jessor, 2014; Mobley & Chun, 2013; Turchik, & Gidycz, 2012; Vazsonyi et al., 2010; Wickwire, et al., 2008). Perhaps the particular relationship between depression and disordered eating is especially strong because these are both somewhat intrapersonal processes. In contrast, problem alcohol use, illicit drug use, and risky sexual behavior may be problem behaviors that are more interpersonal in nature and involve other people and often occur in social settings. Perhaps those athletes who were struggling with depression and isolation were more likely to engage in the particularly private problem behavior of disordered eating. Additionally, the other problem behaviors in this study do not have potential benefits regarding athletic performance. Disordered eating, however, can be intimately connected with athletic performance, especially with weight-based performances. It may be that athletes who are depressed are more likely to engage in disordered eating because it could yield possible benefits for their athletic performance.

Surprisingly, social support was not negatively related to any of the problem behaviors (H3e). According to Jessor (2014), lack of social support is one of the strongest predictors of engagement in problem behaviors. As suggested previously, for college students’ problem alcohol use, illicit drug use, and risky sexual behavior are generally interpersonal behaviors not typically done in isolation. Perhaps social support, which seems to be more about family than friends (i.e.,
Multidimensional Scale of Perceived Social Support), just does not relate to the construct of engagement in problem behaviors due to the proximation between the two variables. Given the distance college students typically have from their social support structures, perhaps any impact that social support would have on college students is too distal to have an effect on problem behaviors. As Chickering and Reisser (1993) argued, college students are often making their own decisions, forming their own separate identities from their families, and are in less connection with their families which may create a separate distinction between social support and engagement in problem behaviors.

**Athletic and Academic Identities, Depression, and Social Support as Moderators of the Relationship between Injury/illness Status and Problem Behaviors**

For RQ4, I hypothesized that athletic identity would moderate the relationship between injury and/or illness, such that the positive relationship between injury and/or illness and problem behaviors would decrease as athletic identity decreased (H4a). I also hypothesized that academic identity would moderate the relationship between injury and/or illness, such that the positive relationship between injury and/or illness and problem behaviors would decrease as academic identity decreased (H4b). Additionally, I hypothesized that depression would moderate the relationship between injury and/or illness, such that the positive relationship between injury and/or illness and problem behaviors would decrease as depression decreased (H4c). Lastly, I hypothesized that social support would moderate the relationship between injury and/or illness, such that the positive relationship between injury and/or illness and problem behaviors would decrease as social support increased (H4d).

The moderation hypotheses related to RQ4 were made with the assumption that injury/illness would be related to all of problem behaviors (i.e., in RQ3). However, injury/illness
emerged as only related to risky sexual behavior and not to problem alcohol use, illicit drug use, or disordered eating. Athletic identity, academic identity, social support, and depression did not emerge as moderators for any other problem behavior. Therefore, I first address athletic identity and social support as the moderators that emerged for risky sexual behavior. I then address academic identity and depression as the moderators that did not emerge for risky sexual behavior.

Although athletic identity and social support did emerge as moderators of the positive relationship between injury/illness status and risky sexual behavior, the results were not in the expected directions. More specifically, regarding athletic identity (H4a), results indicated that if non-injured/ill athletes had high athletic identity, they were more apt to participate in risky sexual behavior. In addition, athletic identity was not related to risky sexual behavior for injured/ill athletes. Regarding social support (H4d), results indicated that non-injured/ill athletes with low social support are more likely to engage in risky sexual behavior than their non-injured/ill peers with high social support. In contrast, social support was not related to risky sexual behavior for the injured/ill group. Perhaps those without injury are more likely to link athletic identity and social support with risky sexual behavior due to their lack of injury/illness experience. It may be that injury/illness is a wakeup call, such that athletic identity and social support are no longer related to risky sexual behavior.

Academic identity and depression did not emerge as a moderator between injury/illness and risky sexual behavior. Academic identity simply does not seem to have a relationship to many constructs in this study. As indicated in the additional preliminary findings section (Appendix R, p. 163), academic identity did have some relationships with variables (e.g., sex and year-in-college) but these relationships had low effect sizes, and neither of those relationships
were with problem behaviors. Perhaps academic identity, in and of itself, is a separate entity which does not moderate between injury/illness and risky sexual behavior.

Regarding depression, although past research has indicated a positive relationship between depression and problem behaviors (De Leo & Wulfert, 2013; Jessor, 2014; Mobley & Chun, 2013; Turchik, & Gidycz, 2012; Vazsonyi et al., 2010; Wickwire, et al., 2008), the level of depression simply may not affect the relationship between injury and risky sexual behavior. Perhaps there are some athletes who experience depression in connection with an injury and others who do not, therefore, minimizing the potential moderating effect of depression on risky sexual behavior.

**Additional Findings: Beyond Hypotheses**

A number of findings emerged that were not connected with my hypotheses. Most specifically these included: difference between intramural/club athletes and non-athletes with regard to illicit drug use, difference between intramural/club and Division I athletes with regard to illicit drug use and athletic identity, and athletic level (i.e., intramural/club versus Division I) as a moderator of the relationship between injury/illness and risky sexual behavior. A small but noteworthy finding emerged regarding severity of injury and disordered eating. And finally, findings emerged in connection with the background variables of relationship status, age, BMI, and GPA.

Connected to the findings in RQ1, the intramural/club athletes scored higher than the non-athletes and the Division I athletes on illicit drug use and problem alcohol use. In addition, non-athletes scored higher than Division I athletes on illicit drug use. In comparison to Division I athletes, intramural/club programs might not have as any screening measures that indicate they have taken illicit substances and/or alcohol prior to competition. Furthermore, as Jessor and Jessor
(1977), argued in their Problem Behavior Theory, individuals’ perceived-environment can make a significant impact on their engagement in problem behaviors. In comparison to non-athletes, perhaps intramural/club athletes are in an environment wherein illicit drug use is accepted and encouraged, which may serve as an instigator for intramural/club athletes’ participation in illicit drug use and problem alcohol use.

A possibility regarding the Division I athletes’ illicit drug use is that Division I athletes’ participation was underreported due to the types of drugs they may be taking. According to past research (e.g., Bents, Tokish, & Goldberg, 2004; Froiland, Koszewski, Hingst, & Kopecky, 2004; Tokish, Kocher, & Hawkins, 2004; Tricker, 2000), the majority of illicit substances college athletes take are focused on enhancing physical performance. Arguably, college athletes may not view performance-enhancing drugs in the same light as other drugs which may negatively affect physical performance (e.g., heroin, marijuana, cocaine), thus potentially underreporting their level of consumption of illicit drugs.

Division I athletes reported higher levels of adherence to their athletic identity than intramural/club athletes. This finding is not surprising, as research indicates that individuals who reach a high level of athletic performance will likely strongly adhere to their athletic identity (Brewer, et. al, 1993). This finding is consistent with Social Identity Theory (Tajfel & Turner, 1979), which indicates that individuals are more likely to develop stronger attachments to their identities when a strong salience exists between their own personal identity and group (i.e., the sports team) belonging (Ashforth, 2001; Gecas, 1982; Hogg & Terry, 2000; Petriglieri, 2011; Tajfel & Turner, 1979).

A positive association between injury/illness status and risky sexual behavior emerged for Division I athletes, but not for their intramural/club peers. Specifically, Division I athletes are more
likely to engage in risky sexual behavior when they encounter an injury/illness, whereas intramural/club athletes’ level of engagement in risky sexual behavior did not differ based on the existence of an injury/illness. This finding is consistent with current research which suggests Division I athletes are more likely to engage in risky sexual behavior than other individuals in college (Chernoff & Davison, 2005; McBride, Reece, & Sanders, 2008; Putukian, 2016). Perhaps Division I athletes are under more pressure to perform for their specific sport, so that when an injury/illness does happen, they may be more prone to engage in risky sexual behavior. Another possibility is that those with a history of risky sexual behavior may truly be more at risk for getting injured/ill. When considering this finding, and the finding above which indicated that Division I athletes reported higher adherence to their athletic identity, this finding is consistent with both Problem Behavior Theory (Jessor and Jessor, 1977) and Social Identity Theory (Tajfel & Turner, 1979), which indicates people who are strongly connected to their identities are more likely to engage in problem behaviors if one or more of those identities is threatened (e.g., via injury/illness).

Severity of injury was related to disordered eating in that the more severe an injury was, the more college students engaged in disordered eating. Surprisingly, severity of illness was not related to any variable at all. These findings are interesting, as most of the research upon which this study was formulated was conducted on severe, career-ending injuries. Only 4.3% of the current sample reported having a “severe injury,” which could have affected the overall results. It is important to note and should be considered when conducting future research.

Participants who were married/partnered/cohabitating scored higher on risky sex than participants who reported the other relationship statuses (i.e., single-not-in-a -relationship, in-a-relationship-but-not-cohabitating, engaged, and single-and-casually-dating). The measure of risky
sexual behavior included items about age of first sexual intercourse, number of sexual partners, and condom use. Regarding condom use, it is possible that the individuals who identified as married/partnered/cohabitating do not use condoms due to their relationship status. Perhaps some of the married/partnered/cohabitating individuals were trying to conceive, or perhaps individuals felt less at-risk for contracting or transferring a sexually-transmitted infections with their partners if they are in a committed relationship. Another idea is that, potentially, individuals who were younger when they started having sex may be more likely to be in a relationship in college.

Age also emerged as being positively associated with risky sexual behavior for the athlete-only sample, with older participants reporting higher rates of risky sexual behavior. Given that the Sexual Behavior Questionnaire (SBQ; CDC, 2008) defines risky sexual behavior partly on the number of sexual partners, perhaps this finding makes intuitive sense, given that people generally have more previous sexual partners as they age and move through relationships.

Participants who were married/partnered/cohabitating scored higher on illicit drug use than participants who reported “other relationship statuses” (i.e., single-not-in-a -relationship, in-a-relationship-but-not-cohabitating, engaged, and single-and-casually-dating). The measure for illicit drug use (DAST-10; Skinner, 1982) use has some items which measures illicit drug use by asking how the family and/or spouse is responding to the participants’ illicit drug use. It is possible that married/partnered/cohabitating participants scored higher on illicit drug use given their close proximity to their partner/spouse. The other relationship statuses, however, are traditionally farther away from their family and may have less negative interactions with their family in connection with illicit drug use, therefore not scoring as high on the illicit drug use measure as the married/partnered/cohabitating group.
BMI emerged as positively related to problem alcohol use for the whole sample and positively associated with athletic identity for the athlete-only subsample. Prior research has suggested a relationship between obesity and problem alcohol use within college students (Traversy & Chaput, 2015). It may be that college students with high BMI are more likely to drink or vice-versa, those who drink more may eventually develop higher BMI. At first glance the positive association between BMI and athletic identity may be counterintuitive, however, it might be consistent with current findings. BMI, or body mass index, is calculated based on height and weight. Some athletes who are heavily muscled might register as “obese,” when in fact they have low body fat and large amounts of muscle (Chen, 2016). It is not uncommon for football players, for example, to be considered obese by BMI standards, but are in fact healthy athletes (Chen, 2016). With this in mind, higher BMI may naturally be associated with higher athletic identity.

GPA emerged as negatively associated with depression for the whole sample. This finding is consistent with current literature, which indicates a negative correlation between GPA and depression (Bryan, Bryan, Hinkson, Bichrest, & Ahern, 2014). Perhaps lower grades lead to depression, or vice-versa. This finding is important, as it speaks to the critical connection between the psychological functioning and academic functioning of college students, as mental health concerns of students are not distinct from their ability to perform and succeed (Heiligenstein, Guenther, Hsu, & Herman, 2010). GPA also emerged as a predictor for alcohol use for the athlete-only sample, with individuals with lower GPA engaging in more problem alcohol use. Unfortunately, it is not possible to determine whether low GPA occurs first or problem alcohol use, however, it is possible that either low GPA or problem alcohol use could affect the other facet of college athletes’ lives. Interestingly, there was a lack of relationship between academic identity and problem alcohol use. These two findings taken together may indicate that problem alcohol use
is not connected to individuals’ attachment to their student identity but is more about their performance as students.

**Clinical Implications**

The findings from this study add to the literature for evidence-based interventions by offering ideas for prevention, education and development, and remediation for college personnel who are working with college students and athletes.

**Prevention**

When Division I athletes are injured/ill, they may be more likely to engage in risky sexual behavior than their Division I peers who are not injured/ill. Knowing this information could help coaches, trainers, sports psychologists, and other personnel involved in college sports to directly discuss this possible relationship with athletes even before injury or illnesses occur. Having open conversations with athletes concerning risky sexual behavior could be instrumental in lowering their tendency to engage in risky sexual behavior if and when they encounter an injury or illness.

Perhaps GPA and BMI could be good screening items to consider regarding certain problem behaviors. Based on my preliminary analysis results, age emerged as positively associated with risky sexual behavior with the athlete-only and general samples, GPA emerged as negatively associated with depression within the athlete-only and general samples, and BMI emerged as positively associated with problem alcohol use within the athlete-only sample. Regarding GPA for non-athletes, college counseling centers could offer psychoeducation to students regarding the connection between depression and GPA. With the athlete-only population, perhaps athletes could take a screening survey that includes questions about GPA and BMI at the beginning of each season, and then throughout the year. Having real-time data would allow coaches and other sports
personnel to monitor students who may be at risk. Although GPA and BMI are not causally related to alcohol use or depression, they could still serve as flags for additional exploration. For example, if athletes exhibit a decline in GPA and an increase in BMI and they seek help *before* things become too distressing for them, perhaps a coach or trainer could offer additional support through confidential means to these athletes. Without calling any attention to any particular athlete, sports personnel could emphasize the opportunity to engage in psychotherapy, noting the potential connections between GPA, BMI, and depression.

The present finding of a positive link between depression and disordered eating could also be useful in prevention. This finding may be most important for sports that are dependent on weight-class (e.g., wrestling, weight-lifting, boxing, etc.). Due to the sensitive nature of this specific problem behavior, sports personnel need to be thoughtful in how they approach this topic. Because the relationship between depression and disordered eating is correlational, both depression levels and disordered eating should be monitored within athletes. It is imperative that college sports personnel keep a consistent check on the physical and emotional well-being of their athletes. For example, sports personnel could administer a simple depression checklist throughout the season or a short measure on disordered eating. Or, in a less-formal way, coaches and trainers could simply have ongoing conversations to see how their athletes are doing emotionally and physically. Sports psychologists could be made available to the athletes, communicating the potential association between depression and disordered eating.

**Education and Development**

Perhaps counter to some narratives about college athletes (Kadish, 2014), the current findings indicated that Division I athletes may engage in lower levels of illicit drugs than their intramural/club and non-athlete peers. Having this information could be instrumental to both the
athlete and non-athlete community in reducing the perception and stigma that Division I athletes may be more prone to problem behaviors. The group that reported the highest rates of illicit drug use were intramural/club athletes. Perhaps this specific population should be a focus for education in the future. Several colleges, such as the one where this study was conducted, have large organizations dedicated to intramural sports, in which hundreds of students participate. The current findings indicate that offering targeted outreach and education regarding the risks of illicit drug use to this specific population could be a useful intervention.

Regarding the significant findings that married/partnered/cohabitating individuals are more likely to participate in illicit drugs and risky sexual behavior than other college students, perhaps this is a missed population that needs more psychoeducation. College health centers could attempt to focus on this group by offering more outreach by providing psychoeducation around the harmful effects of risky sexual behavior and illicit drug use.

**Remediation**

Regarding the specific findings of this study, the majority of the remediation work could focus on depression and disordered eating and BMI and problem alcohol use. Due to these relationships being correlational, it is imperative that personnel who are working with college students and athletes realize that some variables (e.g., depression or BMI) may be predicting the problem behaviors, or the problem behaviors could be predicting those variables (e.g., depression or BMI). For example, regarding disordered eating and depression, psychotherapists in college counseling centers could monitor both facets within their existing clients. If either disordered eating or depression become relevant in clients’ lives, the psychotherapists could provide both psychoeducation and therapy regarding the connection between disordered eating and depression. Similarly, with BMI and problem alcohol use, psychotherapists within college counseling centers,
as well as sports psychologists within athletic teams who are already treating college students and athletes, could monitor both BMI and problem alcohol use. These mental health personnel could provide psychoeducation and support for the college students and athletes who are being seen that currently have high BMI and/or are already engaging in problem alcohol use.

**Threats to Validity and Limitations**

The current study has several threats to validity and limitations which I address in this section. The threats to validity and limitations can be grouped into three main categories including (a) sample and generalizability, (b) research design and statistics, and (c) measurement.

**Sample and Generalizability**

The present study is limited by its sampling, and thus its generalizability, in that these data were collected in a specific place at a specific time. The data were collected from Purdue University, a Midwest land-grant university in semi-rural Indiana. The sample is not representative of other students or athletes who are attending other large institutions across the country, or liberal arts institutions or community colleges in other parts of the country. Furthermore, given that the entire sampling consisted of college students aged 18-25, this study is not representative of other age groups (e.g., emerging adults not in college, older adults).

Perhaps the most important limitation in this study to note, regarding sample, is the low number of participants in the Division I group. Only 27 Division I athletes participated, greatly affecting the results of this study. Some of the problems with low sample size include a lower likelihood of detecting significant differences, low statistical power, and low reproducibility of the results (Button, Ioannidis, Mokrysz, Nosek, Flint, Robinson, & Munafo, 2013). Another important limitation to note is the level of injuries/illnesses severity that was included in this current sample.
The majority of the research literature upon which this study was based (e.g., Brewer et al., 1993; Petitpas & Danish, 1995; Putukian, 2016; Strauss, 2014) was done on athletes who had season-ending injuries. In this current study, only 4.3% of the sample had a season-ending injury/illness. The lack of participants in the “severe injury/illness” category may have affected the results.

In addition, the homogeneous nature of the sample limited generalization to underrepresented groups. The majority of participants were White, heterosexual, and female. There were very few participants from underrepresented groups (e.g., racial/ethnic, sexual orientation). College students from underrepresented groups may be more susceptible to engage in problem behaviors based on the Minority-Stress Model (Meyer, 2003). Due to the stressors of being part of a marginalized group (e.g., being ostracized, experiencing hate crimes, feeling prejudice, suffering sexism), individuals who are in minority groups may be at risk for participating in problem behaviors as a way to cope (Meyer, 2003). The preliminary analyses indicated some differences in engagement in problem behaviors between straight and gay/lesbian participants, but the sample was so low I cannot be sure that I was able to detect actual differences.

Additionally, because students individually chose whether to participate in the online survey, the sample may be biased by self-selection and self-report. The participants could have been biased in terms of higher or lower engagement in problem behaviors. It is unclear how exactly they may have been biased specifically, but it is a possible limitation in that the students who self-selected for a survey that was explicitly gathering information on problem behaviors could have been more or less likely to engage in problem behaviors. More specifically, the title of the survey, which was sent to the students, “Participants Needed for Study on Identity, Injury/Illness, and Risky Behaviors—Chance to Win $25 Amazon Gift Card!” may have encouraged or discouraged certain types of students not to take the survey. Potentially, students could have assumed the study
did not apply to them if they had not suffered from an injury and/or illness. Furthermore, if students
did not want to report their problem behaviors, it is likely that they disregarded the survey email.

The current sample of Division 1 athletes was likely biased. More specifically, the majority
of the participants were female track and field athletes (i.e., n = 11, 41%). Perhaps these athletes
were more prone to answer the questions on the survey in a particular manner, which may have
impacted the results. It is also possible that those athletes who had a possible future in professional-
level sports may have adhered more strongly to their athletic identity, adding additional possible
bias as they did not compose much of the current sample of Division 1 athletes. It is possible that
athletes who do not have the option of participating in their sport at a professional level may adhere
less to their athletic identity, thereby impacting the results and perhaps even the internal
consistency of the athletic identity measure.

A final limitation is that perhaps some data were missed in this study. Even though severity
of injury/illness was measured, and severity of injury was only significantly related to disordered
eating, perhaps some individuals were not included in the study because they were athletes who
had become so ill/injured that they were permanently removed from their sport(s). For example,
there could have been individuals who competed in Division I athletics as a first-year student and
then encountered an injury/illness that completely ended their athletic career. If those individuals
had taken part in the survey as sophomores, they would have identified themselves as “students”
rather than “athletes” due to their non-participation. Potentially, if these individuals participated
in the survey only as a student, when in fact they had participated in Division I sports previously,
those data may have been missed.
Research Design and Statistics

Limitations exist with regard to the cross-sectional design of the study. It was not possible for me to randomly assign athletes or any participants to injury/illness status. Furthermore, due to this design, the results in this study cannot be used to ascertain causation, but only whether relationships existed among variables (Johnson, Burke, & Christensen, 2017). Also, potentially connected to the cross-sectional design of the study, it is possible the participation in problem behaviors may have been underreported. According to Merrill (2017) and the incidence-prevalence bias, it is possible that the rates of participation in risky behaviors were lower than in reality because the survey was given at one specific point in time rather than multiple times over a longer period.

Additionally, given the time of year (i.e., spring semester before spring break), students’ rates of problem behaviors may have been affected. This particular time period, which is typically associated with higher rates of problem behaviors in college students, is actually associated with underreporting on surveys when they are given at this time (Mattila, Apostolopoulos, Sönmez, Yu, & Sasidharan, 2001; Midanik, 1988). It is possible the participants were underreporting their engagement in problem behaviors due to the time period in which this survey was taken, which may have affected the overall results.

A final limitation in design is that I could not include every kind of problem behavior or potential confounding variable. Smoking, risk-taking, and problem gambling are just three examples of additional problem behaviors in the general college student population (Mobley & Chun, 2013; Vazsonyi et al., 2010; Wickwire, et al., 2008) that could have been measured, but due to the number of items already on the survey, were not included. These problem behaviors that were not assessed could have altered the results of the study or could have been associated with
injury more than the problem behaviors that were included. Other variables, as indicated by the Problem Behavior Theory (Jessor & Jessor, 1977), that were not assessed and could have altered the results are levels of parental approval, personality characteristics (e.g., self-esteem, isolation, extraversion/introversion), and adherence to religiosity.

**Measurement**

The present study is limited by measurement strategies. Regarding the Athletic Identity Measurement Scale (AIMS), the low Cronbach’s alpha is a limitation. This low Cronbach’s alpha (.58) may be in connected with the variety of athletes who participated in this study. In previous studies, wherein high internal consistencies were found (Brewer, Selby, Under, & Pettipas, 1999; Brewer, Van Raalte, & Linder, 1993), all of the athletes were from the same level (i.e., all Division I).

The Academic Identity Measurement Scale is a limitation for this study. I created this measure via a modification of the Athletic Identity Measurement Scale. Although the Cronbach’s alpha indicated good reliability (.84; Tabachnik & Fidell, 2013), this study was still the first time the modified measure was used, and it is unclear if the construct of academic identity is being accurately measured. Based on the findings of this study, nothing emerged regarding academic identity, which could have been related to the modified nature of the scale. Future studies would benefit from using or designing a measure that was valid and reliable in its capture of academic identity.

Another limitation of this study is the timing of the injury/illness versus the timing noted in the directions for the academic and athletic identity measures. In the survey, participants were asked about injuries/illnesses that took place within the last two years. In contrast participants were asked about their current academic and athletic identities. It is possible that the effect(s) of the
injuries/illnesses could have been minimized if indeed the injuries/illnesses had taken place two years prior to participants’ completion of the survey. Perhaps future studies could shorten the time since injury/illness in order to more accurately assess the relationship between academic and athletic identity adherence and injury/illness.

The risky sexual behavior questionnaire is also a limitation for this study. The Sexual Behavior Questionnaire (SBQ; CDC, 2008), indicates risky sexual behavior consists mainly of age of first sexual intercourse, number of sexual partners, and condom use. Given the narrow range and past-oriented nature of items, it is possible the results could have been affected by this questionnaire. Perhaps another measure, such as the Sexual Risky Survey (SRS; Turchik & Garske, 2008), could have been used in order to gain a richer assessment and understanding of risky sexual behavior. Unfortunately, due to the number of problem behaviors and number of items already in my survey, I was not able to use a lengthy measure such as the SRS (i.e., 37 items). Future studies examining problem behaviors would benefit from having a deeper assessment of risky sexual behavior. Another potential area to study would be to determine whether risky sexual behavior contributed to injury/illness. Perhaps individuals who have higher rates of risky sexual behavior were more likely to get injured or ill. Future studies may be able to determine if risky sexual behavior is a proxy for injury/illness.

The Drug Abuse Screening Test (DAST-10; Skinner, 1982) is also a limitation for this study. Previous research regarding athletes has indicated that Division I athletes participate in performance-enhancing drugs more than non-athletes (e.g., Bents, Tokish, & Goldberg, 2004; Froiland, Koszewski, Hingst, & Kopecky, 2004; Tokish, Kocher, & Hawkins, 2004; Tricker, 2000). Due to the DAST-10 not specifically asking about performance-enhancing drugs, it is possible the results were underreported, specifically for the Division I athletes. One option would
be to adapt an existing measure, such as the DAST-10, specifically for performance-enhancing substances. Another option would be to administer a more-thorough measure, such as the picture-based brief implicit association test (BIAT; Brand, Heck, & Ziegler, 2014) which assesses athletes’ attitudes toward performance-enhancing techniques, such as blood doping. The BIAT is associated with attitudes toward illicit means of performance-enhancing methods and engagement in blood doping and other methods of performance-enhancement (Brand, Heck, & Ziegler, 2014). Specifically, the more athletes view performance-enhancing techniques in a positive light, the more likely they are to engage in performance-enhancing measures themselves (Brand, Heck, & Ziegler, 2014). This type of measure would be an excellent way to ascertain athletes’ views toward illicit substances, and whether they may be taking part in performance-enhancing drugs.

The measurement I used of BMI is a limitation of the study. As Chen (2016) suggested, BMI is not always an accurate assessment of athletes’ health due to different body types and muscle mass. Based on the conversion calculation for BMI, height and weight are the two statistics that are necessary to calculate BMI. It may be, however, that the construct of BMI is not an accurate or reliable measure for overall physical health. A future possibility would be to measure height, weight, body fat, and muscle mass within athletes’ bodies, thereby having a more accurate representation of individuals’ health. This new approach would be much more accurate in attaining overall health of individuals when compared to BMI.

**Implications for Future Research**

Future research is needed to more fully understand the associations between athletic identity, academic identity, injury/illness, problem behaviors, and depression and social support. In this subsection I offer suggestions for future research, including specific ideas for (a) sample/sampling procedure, (b) research design, and (c) measurement.
Sample and Sampling Procedure

Future researchers examining, athletic identity, academic identity, injury/illness, problem behaviors and depression and social support need to recruit more diverse samples (e.g., age, sex, racial/ethnic identity, sexual orientation, geographic region, and type of institution). More diverse samples would allow for greater generalizability of findings. Furthermore, collection of larger and more heterogeneous samples would allow researchers to compare problem behaviors between non-athlete college students and college athletes from different regions of the United States. In addition, comparisons could be made between individuals who identified with different racial/ethnic backgrounds and different sexual orientations.

Future researchers need to consider creative strategies for recruiting Division I athletes as participants. Possible ideas include presenting data about athletes and problem behaviors related to sport performance to sports trainers, coaches, and psychologists to increase their openness to being involved in recruitment. It might be beneficial to include more or different incentives (e.g., gift cards for food, gas cards, or iTunes gift cards) to encourage athletes to participate in the study. Including fewer items on the overall survey would likely increase full participation. Randomizing the order of the measures might assist in reducing the potentially challenging effect of having all of the problem behavior measures in a row.

Another way to recruit Division I athletes as participants would be to gather data from athletes at several different Division I institutions. Although data from college athletes is historically difficult to gather, having more than one Division I program to provide data would be extremely beneficial. It might be beneficial, as well, to compare and contrast athletes from different schools that have different strong points within their sports programs. For example, does athletic identity among basketball players at University of Kentucky, who were nationally ranked as one
of the top ten teams in the nation in 2018, differ from athletic identity among basketball players at Montana State University, who were ranked very low in 2018? Looking at different programs across geographic regions would also present richer and deeper data as well. For example, Division I programs from the Northeast, Southeast, Midwest, Northwest, and Southwest could all be surveyed in order to see potential trends among the data across geographic regions in the United States.

Research Design

Regarding research design, future researchers could use longitudinal and repeated measures designs to examine the associations among problem behaviors, athletic identity, academic identity, depression and social support over time. If future researchers were able to study problem behaviors over the course of a year, or even four years, they could glean information that would be highly valuable to college personnel. As an example, if researchers could give questionnaires at the beginning and end of each academic year, trends in the data could be analyzed in ways to see how identity potentially changes, how injury/illness affects students/athletes over a year, and how depression and social support may be related to all of the above variables.

Qualitative and mixed-methods design could aid in a deeper understanding of how college athletes and non-athletes perceive their injury and/or illness. For example, if researchers could gather qualitative data via narrative exposés, much deeper and richer information could be gleaned as to how those injuries and/or illnesses possibly affected college students and athletes. It is possible that those narratives within the qualitative data could shed light as to why students engage in potential problem behaviors during times of injury/illness. Furthermore, qualitative data collected in conjunction with quantitative data would maximize the efficiency and productivity of the research.
Measurement

Additional measure development is needed to accurately assess problem behaviors, athletic identity, academic identity, depression and social support. Specifically, regarding this study, more accurate measurement for risky sexual behavior is needed, a formally developed and standardized measure of academic identity would be useful, and a cohesive, integrated measure for problem behaviors would be highly beneficial for future research.

Risky sexual behavior is often identified in the literature as a problem behavior for college students (Chernoff & Davison, 2005; McBride, Reece, & Sanders, 2008), but its definitions are as varied as the number of publications on which the topic is written. A uniform and synthesized measure designed to assess risky sexual behavior would be highly beneficial in moving forward with research focused on athletes’ problem behaviors. As this particular variable emerged as important for athletes, and particularly for injured Division I athletes, it is imperative to determine a clear definition and design measures that can capture risky sexual behavior.

Furthermore, researchers might find it useful to create specific measures of risky sexual behavior for their culture and community. Definitions of risky sexual behavior can vary by culture. For example, Latin@ culture views sexual behavior primarily through the lens of religiosity and familial values, which may result in higher rates of risky sexual behavior than their White counterparts, who view sexual behavior primarily through an individualistic lens (Deardoff, Tschann, Flores, & Ozer, 2010). Although risky sexual behavior, in this study, was based on age of first sexual intercourse, number of sexual partners, and condom use, there are perhaps more facets that could be included to construct a more holistic approach to measuring risky sexual behavior. For example, the current measure did not include an assessment of the consensual nature of first intercourse. Those who indicated first intercourse at age 14 or below were given a higher risk
rating based on this age variable, when in fact they may have been forced to do something that was not their choice. Current literature is mixed as to whether sexual abuse will result in risky sexual behaviors later in life (Homma, Wang, Saewyc, & Kishor, 2012), however, it is important to realize other factors may have been present, or may be currently present, when measuring engagement in risky sexual behavior.

Due to the absence of a measure for academic identity, I adapted the Athletic Identity Measurement Scale to apply to academics. It would be beneficial for future researchers to create a scale specifically designed to measure academic identity in order to improve construct validity. In order to develop this measure, I believe it would be most beneficial to norm it on several college-student populations across a variety of regions in the United States. More specifically, using diverse samples to determine the most consistent elements across differences that are a part of the construct of academic identity would be ideal. Similar to the way in which the Athletic Identity Measurement Scale was created, I believe that the core construct of the measure will be determined by the actual responses from college students.

Regarding the measurement of problem behaviors, I think it would be advantageous to create a single measure that assesses a variety of problem behaviors, using a consistent structure and format. In the current study, I had to find a different measure for each corresponding problem behavior. It would be beneficial if a single-unit scale could be used that encompasses several problem behaviors in order to give participants their own “problem behavior score.” Additionally, each participant could have his/her own problem behavior number, a total score which would indicate a range of problem behaviors that encompass many domains.

Another possible measure to take into account for future research is resiliency (Hartley, 2011). Due to the possible effect that resiliency may have on individuals’ reactions to adverse life
events (e.g., injury or illness), it may be prudent to assess level of resiliency in future research. Taking this variable into account could aid in better understanding athletes’ and students’ responses, or lack of response, to difficult events during college and/or athletics.

**Conclusion**

In this study, I examined the predictions of problem behaviors in college students based on injury/illness status, athletic and academic identities, and depression and social support. Although many of the results were not as expected, certain findings did emerge that can guide future research and enlighten the work of mental health professionals. With regard to athletic involvement and problem behaviors, the results indicated that intramural/club athletes used illicit drugs and alcohol more than non-athletes and Division I athletes. Interestingly, no differences emerged between the groups for risky sexual behavior, disordered eating, depression or social support. However, findings did suggest that Division I athletes may be more at risk than their intramural/club peers of engaging in risky sexual behavior when they are injured or ill. Other findings, such as the positive relationship between depression and disordered eating, and the negative relationship between depression and GPA, are of importance for both counseling center clinicians and athletic staff, as current research indicates depression among college students is at an all-time high (Young, 2016). The current study provides minimal support for both Problem Behavior Theory (Jessor & Jessor, 1977) and Social Identity Theory (Tajfel & Turner, 1979), although with some limitations.

Despite limitations regarding low sample size of Division I athletes, homogeneity of sample, use of modified measures, and cross-sectional design, the current study included a number of important elements that moved beyond past research. More specifically, I included two domains of identity (i.e., athletic and academic), four distinct problem behaviors (i.e., risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating), depression, and social support in
connection to both Problem Behavior Theory (Jessor & Jessor, 1977) and Social Identity Theory (Tajfel & Turner, 1979). In addition, the findings can serve as an important catalyst for future research, particularly in the areas of injury/illness and risky sexual behavior of Division I athletes, the connections between depression and GPA and disordered eating, athlete level and illicit drug use, relationship status with illicit drug use and risky sexual behavior, and BMI and problem alcohol use.
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APPENDIX A. DEMOGRAPHIC QUESTIONNAIRE

1. Age:
   ____ years

2. Gender:
   ___ Female
   ___ Male
   ___ Transgender
   ___ Other (Please describe): ______________

3. Height: _____ inches

4. Weight: _____ pounds

5. Race/Ethnicity (Select one or more):
   ___ African American
   ___ American Indian or Alaskan Native
   ___ Asian American
   ___ Hispanic or Latino American
   ___ Native Hawaiian or Other Pacific Islander
   ___ Middle Eastern
   ___ White (not of Hispanic origin)
   ___ Biracial/Multiracial (Please specify: ________________)
   ___ International Student (National origin: __________)
   ___ Other: (Please specify: ______________________)

6. Sexual Orientation:
   ___ Heterosexual
   ___ Gay
   ___ Lesbian
   ___ Bisexual
   ___ Other (Please specify: ________________)

7. Year at college:
   ___ First year undergraduate
   ___ Sophomore
   ___ Junior
   ___ Senior
   ___ Masters
   ___ Doctoral
8. Current Student Status:
   ___ Full-time student
   ___ Part-time student
   ___ Non-student

9. Current Cumulative GPA: __________

10. Current Relationship Status:
    ___ Single, please specify:
    ___ Not in a relationship
    ___ In a relationship but not cohabitating
    ___ Cohabiting
    ___ Married
    ___ Engaged
    ___ Divorced
    ___ Married and separated
    ___ Widowed

11. Please indicate whether you are a domestic or international student:
    ___ Domestic
    ___ International

12. In which sport(s) have you participated on a varsity level? Check all that apply.
    ___ Soccer
    ___ Indoor Volleyball
    ___ Sand Volleyball
    ___ Basketball
    ___ Cross Country
    ___ Golf
    ___ Lacrosse
    ___ Softball
    ___ Baseball
    ___ Swimming/Diving
    ___ Tennis
    ___ Wrestling
    ___ Track & Field
    ___ Handball
    ___ Dodgeball (any variation)
    ___ Racquetball
    ___ Disc Golf
    ___ Flag Football
    ___ Floor Hockey
    ___ Water Polo
    ___ Kickball
___ Badminton
___ Water Volleyball
___ Wiffleball
___ Rowing
___ Other (_____________)

12. In which sport(s) have you participated on a club level? Check all that apply.
___ Soccer
___ Volleyball
___ Basketball
___ Cross Country
___ Golf
___ Lacrosse
___ Softball
___ Baseball
___ Swimming/Diving
___ Tennis
___ Wrestling
___ Track & Field
___ Handball
___ Dodgeball (any variation)
___ Racquetball
___ Disc Golf
___ Flag Football
___ Floor Hockey
___ Water Polo
___ Kickball
___ Badminton
___ Water Volleyball
___ Wiffleball
___ Rowing
___ Other (_____________)

13. In which sport(s) have you participated on an intramural level? Check all that apply.
___ Soccer
___ Volleyball
___ Basketball
___ Cross Country
___ Golf
___ Lacrosse
___ Softball
___ Baseball
___ Swimming/Diving
___ Tennis
___ Wrestling
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___ Track & Field
___ Handball
___ Dodgeball (any variation)
___ Racquetball
___ Disc Golf
___ Flag Football
___ Floor Hockey
___ Water Polo
___ Kickball
___ Badminton
___ Water Volleyball
___ Wiffleball
___ Rowing
___ Other (____________)

14. Has an injury or illness of any kind kept you from participating in the last 2 years? Y/N

15. How long ago was the injury? _______ days

16. If yes, was the injury or illness a season-ending one? Y/N

17. How many days of sport participation did you miss due to your injury or illness?

18. If you sustained an injury in the last two years that took you out of participation in your sport, please indicate where the injury occurred. Check all that apply.
   ___ Bone
   ___ Ligament
   ___ Joint
   ___ Tendon
   ___ Muscle
   ___ Brain
   ___ Other

19. How many days of sport participation did you miss due to your injury?

20. If you experienced an illness in the last two years that took you out of participation in your sport, please indicate what kind of illness you had. Check all that apply.
   ___ Meningitis
   ___ Common cold/flu
   ___ Foodborne illness
   ___ Sexually transmitted infection/HIV
   ___ Mononucleosis
   ___ Strep infections
   ___ Other
21. How many days of sport participation did you miss due to your illness?

22. How severe would you say your injury or illness was? (use the sliding scale below)

23. Using the box below, you may describe the injury or illness if you wish.
APPENDIX B. ATHLETIC IDENTITY MEASUREMENT SCALE (AIMS)

(Brewer, Van Raalte, & Linder, 1993)

Circle your answer to these simple statements to the degree you agree with them. Said another way, 1 is low agreement and 7 is high agreement.

Please base your responses on how you’ve been feeling recently. Use the rating scale to find the number that best matches how you feel and type that number in the space next to the corresponding statement. There are no right or wrong answers; we are interested in what you think and feel.

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1. I consider myself an athlete.
2. I have many goals related to sports.
3. Most of my friends are athletes.
4. Sport is the most important part of my life.
5. I spend more time thinking about sport than anything else.
6. I need to participate in sport to feel good about myself.
7. Other people see me mainly as an athlete.
8. I feel bad about myself when I do poorly in sport.
9. Sport is the only important thing in my life.
10. I would be very depressed if I were injured and could not compete in sport.
APPENDIX C. ACADEMIC IDENTITY MEASUREMENT SCALE
ATHLETIC IDENTITY MEASUREMENT SCALE (AIMS)—ADAPTED

(Brewer, Van Raalte, & Linder, 1993)

Circle your answer to these simple statements to the degree you agree with them. Said another way, 1 is low agreement and 7 is high agreement.

Please base your responses on how you’ve been feeling recently. Use the rating scale to find the number that best matches how you feel and type that number in the space next to the corresponding statement. There are no right or wrong answers; we are interested in what you think and feel.

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<td>Agreement</td>
<td>Agreement</td>
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</tbody>
</table>

1. I consider myself an academic student.
2. I have many goals related to my academics.
3. Most of my friends are highly invested in their academics.
4. Academics is the most important part of my life.
5. I spend more time thinking about academics than anything else.
6. I need to be engaged in academics to feel good about myself.
7. Other people see me mainly as an academic student.
8. I feel bad about myself when I do poorly in my academics.
9. Academics is the only important thing in my life.
10. I would be very depressed if I could not be involved in academics.
APPENDIX D. RISKY SEXUAL BEHAVIOR SCALE SEXUAL BEHAVIOR QUESTIONNAIRE (SBQ)—ADAPTED

(Center for Disease Control and Prevention, 2008)

Please answer every question in regard to your sexual activity. If you have difficulty with a statement, then choose the response that is mostly right.

<table>
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<tr>
<th>Questions</th>
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<th>1</th>
<th>2</th>
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</thead>
<tbody>
<tr>
<td>1. How old were you when you had sexual intercourse for the first time?</td>
<td>never had sex</td>
<td>engaged in sex at age 13 or older</td>
<td>engaged in sex before age 13</td>
</tr>
<tr>
<td>2. During your life, with how many people have you had sexual intercourse?</td>
<td>never had sex</td>
<td>less than six people</td>
<td>6 or more people</td>
</tr>
<tr>
<td>3. The last time you had sexual intercourse, did you or your partner use a</td>
<td>never had sex</td>
<td>condom use</td>
<td>no condom use</td>
</tr>
<tr>
<td>condom?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX E. DRUG ABUSE SCREENING TEST (DAST-10)

(Skinner, 1982)

The following questions concern information about your potential involvement with drugs excluding alcohol and tobacco during the past 12 months. Carefully read each statement and decide if your answer is “YES” or “NO”. Then, check the appropriate box beside the question.

When the words “drug abuse” are used, they mean the use of prescribed or over-the-counter medications used in excess of the directions and any non-medical use of any drugs. The various classes of drugs may include but are not limited to: cannabis (e.g., marijuana, hash), solvents (e.g., gas, paints etc....), tranquilizers (e.g., Valium), barbiturates, cocaine, and stimulants (e.g., speed), hallucinogens (e.g., LSD) or narcotics (e.g., Heroin). Remember that the questions do not include alcohol or tobacco.

Please answer every question. If you have difficulty with a statement, then choose the response that is mostly right.

These questions refer to the past 12 months only.

1. Have you used drugs other than those required for medical reasons?
2. Do you abuse more than one drug at a time?
3. Are you always able to stop using drugs when you want to?
4. Have you had “blackouts” or “flashbacks” as a result of drug use?
5. Do you ever feel bad or guilty about your drug use?
6. Does your spouse (or parent) ever complain about your involvement with drugs?
7. Have you neglected your family because of your use of drugs?
8. Have you engaged in illegal activities in order to obtain drugs?
9. Have you ever experienced withdrawal symptoms (felt sick) when you stopped taking drugs?
10. Have you had medical problems as a result of your drug use (e.g., memory loss, hepatitis, convulsions, bleeding etc....)?
APPENDIX F. ALCOHOL USE DISORDERS IDENTIFICATION TEST (AUDIT)

(World Health Organization, 1992)

Please answer every question in regard to your alcohol consumption during the past 12 months. If you have difficulty with a statement, then choose the response that is mostly right. The answers available range from 0 to 4.

Please refer to the chart below to acquaint yourself with standard drink equivalents.

<table>
<thead>
<tr>
<th>Questions</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How often do you have a drink containing alcohol?</td>
<td>Never</td>
<td>Monthly or less</td>
<td>2-4 times a month</td>
<td>2-3 times a week</td>
<td>4 or more times a week</td>
</tr>
<tr>
<td>2. How many drinks containing alcohol do you have on a typical day when you are drinking?</td>
<td>1 or 2</td>
<td>3 or 4</td>
<td>5 or 6</td>
<td>7 to 9</td>
<td>10 or more</td>
</tr>
<tr>
<td>3. How often do you have six or more drinks on one occasion?</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
</tr>
<tr>
<td>4. How often during the last year have you found that you were not able to stop drinking once you had started?</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
</tr>
<tr>
<td>5. How often during the last year have you failed to do what was normally expected of you because of drinking?</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
</tr>
<tr>
<td>6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
</tr>
<tr>
<td>7. How often during the last year have you had a feeling of guilt or remorse after drinking?</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
</tr>
<tr>
<td>8. How often during the last year have you been unable to remember what happened</td>
<td>Never</td>
<td>Less than monthly</td>
<td>Monthly</td>
<td>Weekly</td>
<td>Daily or almost daily</td>
</tr>
</tbody>
</table>
9. Have you or someone else been injured because of your drinking?  
   Yes, but not in the last year  
   Yes, during the last year  

   No

10. Has a relative, friend, doctor, or other health care worker been concerned about your drinking or suggested you cut down?  
   Yes, but not in the last year  
   Yes, during the last year  

   No

### STANDARD DRINK EQUIVALENTS

<table>
<thead>
<tr>
<th>BEER or COOLER</th>
<th>APPROXIMATE NUMBER OF STANDARD DRINKS IN:</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 oz. ~5% alcohol</td>
<td>12 oz. = 1 16 oz. = 1.3 22 oz. = 2 40 oz. = 3.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MALT LIQUOR</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>8-9 oz. ~7% alcohol</td>
<td>12 oz. = 1.5 16 oz. = 2 22 oz. = 2.5 40 oz. = 4.5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TABLE WINE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5 oz. ~12% alcohol</td>
<td>a 750 mL (25 oz.) bottle = 5</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>80-proof SPIRITS (hard liquor)</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5 oz. a mixed drink = 1 or more*</td>
<td>a pint (16 oz.) = 11</td>
</tr>
<tr>
<td></td>
<td>a fifth (25 oz.) = 17</td>
</tr>
<tr>
<td></td>
<td>1.75 L (59 oz.) = 39</td>
</tr>
</tbody>
</table>

*Note: Depending on factors such as the type of spirits and the recipe, one mixed drink can contain from one to three or more standard drinks.
APPENDIX G DISORDERED EATING BEHAVIOR QUESTIONNAIRE (DEBQ) RESTRAINED EATING SUBSCALE

(Van Strien, Frijters, Bergers, & Defares, 1986)

Sometimes people’s patterns of eating can shift and change over time. Please read each question carefully and respond from 1 (Never) to 5 (Always) as honestly as you can for your recent eating behavior during the past 12 months.

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Never</td>
<td>Rarely</td>
<td>Sometimes</td>
<td>Often</td>
<td>Very Often</td>
</tr>
</tbody>
</table>

1. If you have put on weight, do you eat less than you usually do?
2. How often do you refuse food or drink offered because you are concerned about your weight?
3. Do you deliberately eat foods that are slimming?
4. Do you try to eat less at mealtimes than you would like to eat?
5. Do you watch exactly what you eat?
6. When you have eaten too much, do you eat less than usual the following days?
7. Do you deliberately eat less in order not to become heavier?
8. How often do you try not to eat between meals because you are watching your weight?
9. How often in the evening do you try not to eat because you are watching your weight?
10. Do you take into account your weight with what you eat?
APPENDIX H. CENTER FOR EPIDEMIOLOGIC STUDIES SHORT DEPRESSION SCALE (CES-D 10)

(Radloff, 1977)

Below is a list of some of the ways you may have felt or behaved. Please indicate how often you have felt this way during the past week by checking the appropriate box for each question.

<table>
<thead>
<tr>
<th>Items:</th>
<th>Rarely or none of the time (less than 1 day)</th>
<th>Some or a little of the time (1-2 days)</th>
<th>Occasionally or a moderate amount of time (3-4 days)</th>
<th>All of the time (5-7 days)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I was bothered by things that usually don't bother me.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. I had trouble keeping my mind on what I was doing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. I felt depressed.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. I felt that everything I did was an effort.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. I felt hopeful about the future.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. I felt fearful.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7. My sleep was restless.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8. I was happy.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9. I felt lonely.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10. I could not &quot;get going.&quot;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX I THE MULTIDIMENSIONAL SCALE OF PERCEIVED
SOCIAL SUPPORT (MSPSS)

(Zimet, Dahlem, Zimet, Farley, 1988)

Instructions: We are interested in how you feel about the following statements. Read each statement carefully. Indicate how you feel about each statement.

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very Strongly Disagree</td>
<td>Strongly Disagree</td>
<td>Mildly Disagree</td>
<td>Neutral</td>
<td>Mildly Agree</td>
<td>Strongly Agree</td>
<td>Very Strongly Agree</td>
</tr>
</tbody>
</table>

1. There is a special person who is around when I am in need.
2. There is a special person with whom I can share joys and sorrows.
3. My family really tries to help me.
4. I get the emotional help & support I need from my family.
5. I have a special person who is a real source of comfort to me.
6. My friends really try to help me.
7. I can count on my friends when things go wrong.
8. I can talk about my problems with my family.
9. I have friends with whom I can share my joys and sorrows.
10. There is a special person in my life who cares about my feelings.
11. My family is willing to help me make decisions.
12. I can talk about my problems with my friends.
APPENDIX J. PRE-EMAIL

FROM: Samuel Nekvasil (snekvasi@purdue.edu)
REPLY TO: Samuel Nekvasil (snekvasi@purdue.edu)

Dear Purdue Student,

My name is Samuel Nekvasil, and I am a doctoral student in Counseling Psychology at Purdue University. I am currently working on my dissertation research under the direction of my advisor, Dr. Heather L. Servaty-Seib, with the purpose of exploring possible associations among identity, injury, illness, and risk behaviors. This study has been determined to be exempt according to the Purdue University IRB Board (IRB Research Project Number: ______).

Next week, I will be sending a link to a survey and would appreciate your participation. Please be watching for this email in the upcoming days.

In order to participate in this survey, you MUST be between the ages of 18 and 25 years old and be an undergraduate student at Purdue University. You will have a chance to enter your name into a random drawing for a $25 Amazon gift card (odds will be 1 in 250) if you choose at the conclusion of the survey.

If you have any questions, please feel free to contact me at snekvasi@purdue.edu or my advisor Dr. Heather Servaty-Seib at servaty@purdue.edu.

Thank you for your help,

Samuel Nekvasil, M.S.
Counseling Psychology Doctoral Student
Department of Educational Studies
Purdue University
Dear Purdue Student,

My name is Samuel Nekvasil, and I am a doctoral student in Counseling Psychology at Purdue University. I am currently working on my dissertation research under the direction of my advisor, Dr. Heather L. Servaty-Seib, with the purpose of exploring possible associations among identity, injury, illness, and risk behaviors. This study has been determined to be exempt according to the Purdue University IRB Board (IRB Research Project Number: ______).

This study will be conducted through an on-line survey and should take about 15 minutes to complete. Participation is voluntary, so you can stop the survey at any time or skip questions at your discretion. If you choose to participate, you will provide all information anonymously. Your answers will be kept completely private, and no one will be able to trace your survey responses back to you.

In order to participate in this survey, you MUST be between the ages of 18 and 25 years old and be an undergraduate student at Purdue University. You will have a chance to enter your name into a random drawing for a $25 Amazon gift card (odds will be 1 in 250) if you choose at the conclusion of the survey. If you would like to participate in this study, please click on the link below.

(Link inserted here)

If you have any questions, please feel free to contact me at snekvasi@purdue.edu or my advisor Dr. Heather Servaty-Seib at servaty@purdue.edu.

Thank you for your help,

Samuel Nekvasil, M.S.
Counseling Psychology Doctoral Student
Department of Educational Studies
Purdue University
APPENDIX L. FOLLOW-UP RECRUITMENT EMAIL

FROM: Samuel Nekvasil (snekvasi@purdue.edu)  
REPLY TO: Samuel Nekvasil (snekvasi@purdue.edu)  

Dear Purdue Student,

My name is Samuel Nekvasil. I am emailing to follow up regarding an email I sent you last week about a study I am conducting. If you have completed the survey – thank you very much, and you need not read further. If you have not yet completed the survey, please consider taking part in my study.

I am a graduate student in Counseling Psychology at Purdue University, and I am currently working on a research project (under the direction of my advisor Dr. Heather L. Servaty-Seib) with the purpose of exploring possible associations among identity, injury, illness, and risk behaviors. This study has been determined to be exempt according to the Purdue University IRB Board (IRB Research Project Number: ______).

This study will be conducted through an on-line survey and should take about 15-20 minutes to complete. Participation is voluntary, so you can stop the survey at any time or skip questions at your discretion. If you choose to participate, you will provide all information anonymously. Your answers will be kept completely private, and no will be able to trace your survey responses back to you.

In order to participate in this survey, you MUST be between the ages of 18 and 25 years old and be an undergraduate student at Purdue University. You will have a chance to enter your name into a random drawing for a $25 Amazon gift card (odds will be 1 in 250) if you choose at the conclusion of the survey. If you would like to participate in this study, please click on the link below.

(Links inserted here)

If you have any questions, please feel free to contact me at snekvasi@purdue.edu or my advisor Dr. Heather Servaty-Seib at servaty@purdue.edu.

Thank you for your help,

Samuel Nekvasil, M.S.  
Counseling Psychology Doctoral Student  
Department of Educational Studies  
Purdue University
APPENDIX M. RECRUITMENT EMAIL TO COACHES/ATHLETIC DIRECTORS

FROM: Samuel Nekvasil (snekvasi@purdue.edu)
REPLY TO: Samuel Nekvasil (snekvasi@purdue.edu)
SUBJECT: Dissertation Research Assistance

(Name of Contact Individual),

I am currently working on my dissertation research under the direction of my advisor, Dr. Heather L. Servaty-Seib. The purpose of this study is to explore the possible associations among sport participation, identity, injury, illness, and maladaptive coping. This study has been determined to be approved by the Purdue IRB board (IRB Research Project Number: 1703018888). I have also received approval from the Purdue Athletics Department from the Assistant Athletics Director, Doug Boersma.

This research is much needed in order to better understand college athletes’ experience and enhance the wellness and wellbeing of college athletes. With the likelihood of encountering an injury and/or illness which takes them out of sport participation, college athletes could be at a greater risk for involvement in maladaptive coping behaviors. For example, if athletes were to sustain an injury or illness taking them out of competition, they may be inclined to engage in problem behaviors such as risky sexual behavior, illicit drug use, problem alcohol use, and disordered eating. The data collected in this study could provide the necessary information to show an association between an injury or illness and those problem behaviors. More specifically, the potential findings in this study could aid in helping coaches and other sports personnel to form preventative efforts for their athletes. All data collected in this study will be anonymous, confidential, and entirely online.

This research is needed in order to better understand college athletes’ experiences and mental health. Even if college athletes have not experienced an injury or illness, their responses would be highly valued and important to this study.

If you have any questions, please feel free to contact me at sneakvasi@purdue.edu or my advisor Dr. Heather Servaty-Seib at servaty@purdue.edu.

Thank you for your help,

Samuel Nekvasil, M.S.
Counseling Psychology Doctoral Student
Department of Educational Studies
Purdue University
APPENDIX N. FOLLOW-UP RECRUITMENT EMAIL TO COACHES/ATHLETIC DIRECTORS

FROM: Samuel Nekvasil (snekvasi@purdue.edu)  
REPLY TO: Samuel Nekvasil (snekvasi@purdue.edu)  

Dear Student-Athlete,

My name is Samuel Nekvasil, and I am a doctoral student in Counseling Psychology at Purdue University. I am currently working on my dissertation research under the direction of my advisor, Dr. Heather L. Servaty-Seib, with the purpose of exploring possible associations among identity, injury, illness, and maladaptive coping. This study has been approved by the Purdue University IRB Board (IRB Research Project Number: 1703018888). This has also been approved by the Athletic Department by Doug Boersma, Assistant Athletics Director.

This study will be conducted through an on-line survey and should take about 15 minutes to complete. Participation is voluntary, so you can stop the survey at any time or skip questions at your discretion. If you choose to participate, you will provide all information anonymously. Your answers will be kept completely private, and no one will be able to trace your survey responses back to you.

In order to participate in this survey, you MUST be between the ages of 18 and 25 years old, be on a Purdue University sports team, and be an undergraduate student at Purdue University. You will have a chance to enter your name into a random drawing for a $25 Amazon gift card (odds will be 1 in 250) if you choose at the conclusion of the survey. If you would like to participate in this study, please click on the link below.

https://purdue.qualtrics.com/SE/?SID=SV_bqjpqKRVwE7psot

If you have any questions, please feel free to contact me at snekvasi@purdue.edu or my advisor Dr. Heather Servaty-Seib at servaty@purdue.edu.

Thank you for your help,

Samuel Nekvasil, M.S.  
Counseling Psychology Doctoral Student  
Department of Educational Studies  
Purdue University
APPENDIX O. ONLINE INFORMATION SHEET

Division I College Athletes, Injury, Illness, Identity, and Maladaptive Coping

Samuel Nekvasil, M.S. & Heather L. Servaty-Seib, Ph. D.

Please Print this Information Sheet for Your Records

What is the purpose of this study?
Thank you for your willingness to take part in this study. The focus of the present study is on the experiences of Division I student athletes and also on the ways student athletes may cope with injury and/or illness. Your responses are important to us even if you have not experienced an injury. If you have experienced injury and/or illness in the past year, you will be presented with additional questions. We truly believe that the findings from this study will make a difference in helping athletic personnel to provide better support to student athletes who have experienced an injury and/or illness. Keep in mind that you can withdraw at any time and skip questions that you prefer not to answer.

What will I do if I choose to be in this study?
The online survey includes questions on a) demographic, injury/illness history, and sports-related information; b) your identity regarding your athletics and academics; c) potential ways of coping you may engage in; and d) your feelings of support and depression. After reading this form, please click the “participate in the study” button below if you wish to participate. You will then be directed to the online survey and be prompted to answer a series of closed and open-ended questions. After completing the survey, you may choose to submit your email in order to enter the drawing to receive one of four Amazon.com electronic gift cards for $25. Each individual who participates in the survey has the option to enter the drawing. All survey answers will be collected anonymously and will not be connected to your email address.

How long will it take to complete this study?
This survey will take approximately 15-20 minutes to complete.

What are the possible risks or discomforts?
There are no foreseeable risks or adverse effects associated with this study. The risk of participating in this study is considered minimal and no greater than what you would encounter in everyday life. Additionally, there is minimal risk of a breach of confidentiality due to the electronic nature of the survey. However, several safeguards are in place to minimize the risk of a breach in confidentiality, which can be found below in the section entitled “Will information about me and my participation be kept confidential?”

Are there any potential benefits?
There are no obvious personal benefits from participating in this study.
Will I receive payments or other incentive?
You will have the option to enter a drawing to win one of four Amazon.com electronic gift cards for $25. At the end of this survey, you will be given the opportunity to enter your email address to enter the drawing. Winners will be selected from all submitted email addresses by using a random number generator. Electing to receive a gift card will not impact the anonymity of your responses; your survey answers will not be connected to the email you send.

Will information about me and my participation be kept confidential?
The privacy and confidentiality of your responses will be protected through multiple methods. We will collect your survey responses anonymously. You are not asked to provide your name or any identifying material other than general demographic information. Your survey answers will not be able to be traced directly to you or your email address. All completed forms will be kept in a secure computer database. Only the researchers of this study (Samuel Nekvasil and Heather L. Servaty-Seib) will be able to access the data. The data from this study will be analyzed collectively, including all responses to this survey. The data will be kept indefinitely, but any reports, publications, or related documents will be reported on an aggregate (not individual) level. The project’s research records may be reviewed by the Institutional Review Board at Purdue University to ensure that your data is being properly protected. Research records may be reviewed by departments at Purdue University responsible for regulatory and research oversight.

If you choose to enter the drawing for one of the four Amazon.com gift cards, you will be directed to provide your email address on a separate survey. Your email address will not be connected to your survey answers. Once the gift cards have been distributed, all email addresses will be disposed of.

What are my rights if I take part in this study?
Your participation in this study is voluntary. You may choose not to participate or, if you agree to participate, you can withdraw your participation without penalty or loss of benefits to which you are otherwise entitled. You can also skip any questions with which you are either uncomfortable or choose not to answer.

Who can I contact if I have questions about the study?
If you have any questions about this research project, you can contact Samuel Nekvasil at snekvasi@purdue.edu or Heather L. Servaty-Seib at servaty@purdue.edu.

If you have questions about your rights while taking part in the study or have concerns about the treatment of research participants, please call the Human Research Protection Program at (765) 494-5942, email (irb@purdue.edu) or write to:
Human Research Protection Program - Purdue University
Ernest C. Young Hall, Room 1032
155 S. Grant St.,
West Lafayette, IN 47907-2114

Documentation of Informed Consent
I have had an opportunity to read this information sheet and understand the nature of the project. I have had an opportunity to ask questions about the research project and my questions have been answered. I am prepared to participate in the research project described above. I can print a copy of this information sheet for my records.

Please Print this Information Sheet for Your Records

I wish to participate in this study

I do not wish to participate in this study
APPENDIX P. LOG-OUT MESSAGE WITH GIFT CARD DRAWING INFORMATION

Thank you for Participating in this Survey!

Please Print this Information Sheet for Your Records

Directions for Entering the Amazon.com Gift Card Drawing:
By participating in this survey, you have become eligible to participate in a drawing for one of four $25 Amazon.com gift cards. If you would like to be entered into the drawing, please click on this link to be directed to another survey. If you choose, complete the following survey to be entered into a drawing for one of the four gift cards. The odds of winning are dependent on the number of responses received but are expected to be 1 in 250 or better. The individuals chosen from this random drawing will receive an email directly from Amazon.com with their gift card information included.

[insert link here]
APPENDIX Q. IMPROVEMENTS

In this section, I will briefly discuss the methods in which I tried to improve the Cronbach’s alpha score for the Athletic Identity Measurement Scale (AIMS; Brewer, Van Raalte, & Linder, 1993). I completed item-by-item deletion analysis, I observed different scales within the measure, I looked at factor analysis for each item, and I also separated the participants by athletic level (i.e., intramural, club, and Division I) and gender in order to try to improve the internal consistency score for the AIMS. Although I made a concerted effort to improve the Cronbach’s alpha, I was unable to increase the score from .58.

First, I completed item-by-item deletion analysis. By using SPSS, I was able to evaluate which items in the measure had significantly lower internal consistency. I then looked at the internal consistency for the entire measure if one item were to be deleted. I performed this analysis for all 10 items on the measure, but none of the single-item deletions improved the overall internal consistency for the measure. Additionally, I completed factor analysis for each of the items to see if they were related. There were no correlations that indicated they were decreasing the internal consistency.

Second, I contacted the author (i.e., Dr. Britton Brewer). He suggested I use a 7-item version of the AIMS and then measure the internal consistency for the 3 subscales within the 7-item AIMS to see if one or more scales was decreasing the internal consistency. The three subscales of the 7-items AIMS are, a) social identity, b) exclusivity, and c) negative affectivity (Brewer, Boin, & Pettipas, 1993). I looked at the internal consistency for each subscale and then the overall Cronbach’s alpha if those subscales were to be deleted. The internal consistency did not increase above .58.
Third, I separated the athletes by athletic level (i.e., intramural, club, and Division I) to see if one or more of the groups’ scores had higher internal consistency on the AIMS. Scores for all three groups had similar Cronbach’s alpha (i.e., intramural = .51, club = .53, and Division I = .59). Thus, all of the groups stayed in the analysis for this study. I also separated by gender (i.e., male and female) to see if scores for one group exhibited higher internal consistency on the AIMS, and each gender by itself was less than the overall Cronbach’s alpha (i.e., female = .47 and male = .51).

Due to these methods not improving the internal consistency of the AIMS, I kept the measure how it was, noting the limitation of the low internal consistency. I expound upon this limitation in Chapter 5 of this document.
APPENDIX R. REVIEW

In this section, I review the preliminary analyses I performed before performing the primary analyses. I first performed correlations among the continuous background variables of age, BMI, and GPA and the primary variables. Next, I conducted preliminary analyses to determine if any of the primary variables varied based on the categorical variables of sex, race, students’ citizenship status, year in college, sexual orientation, current student status, and current relationship status. I performed these analyses for the overall sample and the athlete-only sample.

Continuous Variables

In the overall sample and the athlete-only samples, age was significantly and positively associated with risky sexual behavior (see p. 69, Table 4). Age was significantly and negatively associated with academic identity within the overall sample only. Age was also significantly and positively associated with risky sexual behavior for both the overall sample and the athlete-only sample.

In the overall sample and the athlete-only sample, BMI was significantly and positively associated with problem alcohol use. In the athlete-only sample, BMI was significantly and positively associated with athletic identity. In the overall sample, but not the athlete-only sample, BMI was significantly and negatively associated with academic identity and significantly and positively associated with disordered eating and depression.

In the overall sample and the athlete-only sample, GPA was significantly and positively associated with academic identity and significantly and negatively associated with problem alcohol use. In the overall sample, but not the athlete-only sample, GPA was significantly and negatively associated with risky sexual behavior and depression.
Regarding controlling for these three continuous variables in my primary analyses, I decided to consider correlations that were at or below .01 significance value as representing substantive association (Cohen, 1988). In addition, I considered only correlations between the background variables and my dependent variables of consideration for each research question. The correlations of focus for the overall sample were the positive correlations between age and risky sexual behavior, as well as the negative correlation between age and academic identity. Additionally, the positive correlation between BMI and both problem alcohol use and disordered eating were significant. Furthermore, with the overall sample, the positive correlation between GPA and academic identity, as well as the negative correlations between GPA and both risky sexual behavior and problem alcohol use were significant (i.e., at or below .01; see Table 1). The correlations of focus for the athlete-only group were the positive correlation between age and risky sexual behavior, as well as the positive correlation between BMI and problem alcohol use and the negative correlation between GPA and alcohol use. Therefore, I controlled for BMI, age, and GPA in RQ1. I controlled only for BMI in RQ2. In the regressions for RQ3 and RQ4 (i.e., athlete-only group), I controlled for age with risky sexual behavior and BMI and GPA with problem alcohol use.

**Categorical Variables**

Regarding sex, I conducted a one-way MANOVA with sex as the independent variable. For this variable, sex was comprised of male, female, and transgender/other. I recoded all the participants who prescribed to transgender and any other sex into one category of transgender/other due to the minimal number of participants in those categories. The MANOVA finding using Wilk’s lambda was significant for sex, $F(14, 1092) = 6.03, p < .001$, partial $\eta^2 = .07$. At the univariate level, the specific dependent variables that varied by sex were academic identity, $F(2, 252) = 6.04,$
$p < .001$, partial $\eta^2 = .02$, depression, $F(2, 252) = 6.80$, $p < .001$, partial $\eta^2 = .02$, risky sexual behavior, $F(2, 252) = 4.44$, $p = .01$, partial $\eta^2 = .02$, disordered eating, $F(2, 252) = 11.31$, $p < .001$, partial $\eta^2 = .04$, and social support, $F(2, 252) = 13.75$, $p < .001$, partial $\eta^2 = .05$. More specifically, post hoc analyses indicated that transgender participants scored higher than males and females with regard to academic identity, depression, and risky sexual behavior. Additionally, female participants scored higher than males and transgender/other with regard to disordered eating and social support. Due to all of the effect sizes being below the medium level (i.e., less than .09), I did not control for sex in any of my primary analyses.

Regarding sex for the athlete-only sample, the MANOVA finding using Wilk’s lambda was significant for sex, $F(8, 146) = 3.12$, $p < .001$, partial $\eta^2 = .05$. For this variable, sex was comprised of only male and female because all participants in the athlete-only sample selected one of these options for sex. At the univariate level, the specific dependent variables that varied by sex were academic identity, $F(1, 153) = 8.91$, $p < .001$, partial $\eta^2 = .06$, and disordered eating, $F(1, 153) = 8.12$, $p = .01$, partial $\eta^2 = .05$. More specifically, post hoc analyses indicated that female participants scored higher than males with regard to academic identity and disordered eating. Due to the effect sizes being below the level for medium effect size (i.e., less than .09), I did not control for sex in any of my primary analyses.

Regarding race, I conducted a one-way MANOVA with race as the independent variable. For this variable, I recoded all students of color into one group due to the minimal number of participants in each separate group. Therefore, I had two groups in the race variable (i.e., White, and Students of Color). The MANOVA finding using Wilk’s lambda was significant for race, $F(7, 545) = 2.42$, $p = .02$, partial $\eta^2 = .03$. At the univariate level, the specific dependent variables that varied by race were depression, $F(1, 551) = 5.54$, $p = .02$, partial $\eta^2 = .01$ and social support, $F(1,$
of Color scored higher than White participants with regard to depression, and White participants scored higher than Students of Color with regard to social support. Due to the effect sizes being below the level for medium effect size (i.e., less than .09) at the univariate level, I did not control for race in any of my primary analyses.

For the athlete-only sample regarding race, the MANOVA finding using Wilk’s lambda was not significant for sex, $F(8, 146) = .97, p = .46$, partial $\eta^2 = .05$. Therefore, I did not consider the univariate level results.

Regarding students’ citizenship status (i.e., domestic or international), I conducted a one-way MANOVA with citizenship status as the independent variable. The MANOVA finding using Wilk’s lambda was not significant for national status, $F(7, 547) = 1.55, p = .15$, partial $\eta^2 = .02$. Therefore, I did not consider the univariate level results.

For the athlete-only sample regarding citizenship, the MANOVA finding using Wilk’s lambda was not significant, $F(8, 146) = .72, p = .67$, partial $\eta^2 = .04$. Therefore, I did not consider the univariate level results.

Regarding year in college, I conducted a one-way MANOVA with year in college as the independent variable. The MANOVA finding using Wilk’s lambda was significant for year in college, $F(21, 1565) = 3.79, p < .001$, partial $\eta^2 = .05$. At the univariate level, the specific dependent variables that varied by year in college were academic identity, $F(3, 551) = 6.67, p < .001$, partial $\eta^2 = .04$, risky sexual behavior, $F(3, 551) = 8.79, p < .001$, partial $\eta^2 = .05$, social support, $F(3, 551) = 2.76, p = .04$, partial $\eta^2 = .02$, and problem alcohol use, $F(3, 551) = 13.68, p < .001$, partial $\eta^2 = .07$. More specifically, post hoc analyses indicated first-years scored higher than sophomores, juniors, and seniors with regard to academic identity. Furthermore, juniors
scored higher than first-years, sophomores, and seniors with regard to risky sexual behavior, social support, and problem alcohol use. Due to the effect sizes being below the level for medium effect size (i.e., less than .09) at the univariate level, I did not control for year in college in any of my regression analyses.

For the athlete-only sample regarding year in college, the MANOVA finding using Wilk’s lambda was significant, $F(24, 418) = 1.84, p = .01$, partial $\eta^2 = .09$. At the univariate level, the specific dependent variables that varied by year in college were academic identity, $F(3, 151) = 2.61, p = .05$, partial $\eta^2 = .05$, depression, $F(3, 151) = 4.73, p < .001$, partial $\eta^2 = .09$, risky sexual behavior, $F(3, 151) = 4.07, p = .01$, partial $\eta^2 = .08$, and problem alcohol use, $F(3, 151) = 2.62, p = .05$, partial $\eta^2 = .05$. More specifically, post hoc analyses indicated juniors scored higher than first-years, sophomores, and seniors with regard to academic identity and problem alcohol use. Additionally, sophomores scored higher than first-years, juniors, and seniors for depression. Finally, seniors scored higher than first-years, sophomores, and juniors for risky sexual behavior. Due to the effects being below the level for medium effect size (i.e., less than .09) at the univariate level, I did not control for year in college in any of my primary analyses.

Regarding sexual orientation, I conducted a one-way MANOVA with sexual orientation as the independent variable. Due to the small number of participants in the gay/lesbian, bisexual, and other groups, the three groups were combined into a gay/lesbian/bisexual/self-defined group. The final $n$ for heterosexual was 475 and for the gay/lesbian/bisexual/self-defined group, $n = 64$. The MANOVA finding using Wilk’s lambda was significant for sexual orientation, $F(7, 531) = 3.70, p < .001$, partial $\eta^2 = .05$. At the univariate level, the specific dependent variables that varied by sexual orientation were depression, $F(1, 537) = 7.59, p = .01$, partial $\eta^2 = .01$ and illicit drug use, $F(1, 537) = 7.36, p = .01$, partial $\eta^2 = .01$. More specifically, post hoc analyses indicated
participants who identified as gay/lesbian/bisexual/self-defined scored higher than those who identified as heterosexual for depression and illicit drug use. Due to the effect sizes being below the level for medium effect size (i.e., less than .09) at the univariate level, I did not control for sexual orientation in any of my primary analyses.

For the athlete-only sample regarding sexual orientation, the MANOVA finding using Wilk’s lambda was not significant, $F(8, 146) = 1.60, p = .13$, partial $\eta^2 = .03$. Therefore, I did not consider the univariate level results.

Regarding current student status (i.e., full-time and part-time), I conducted a one-way MANOVA with current student status as the independent variable. The MANOVA finding using Wilk’s lambda was not significant for current student status, $F(7, 547) = 1.80, p = .08$, partial $\eta^2 = .02$. Therefore, I did not consider the univariate level results. For the athlete-only sample regarding student status, the MANOVA finding using Wilk’s lambda was not significant, $F(8, 146) = .33, p = .95$, partial $\eta^2 = .02$. Therefore, I did not consider the univariate level results.

Regarding current relationship status (i.e., single-not-in-a-relationship, in-a-relationship-but-not-cohabitating, married/partnered/cohabitating, engaged, single and casually dating), I conducted a one-way MANOVA with current relationship status as the independent variable. The MANOVA finding using Wilk’s lambda was significant for current relationship status, $F(28, 1956) = 8.01, p < .001$, partial $\eta^2 = .09$. At the univariate level, the specific dependent variables that varied by current relationship status were depression, $F(4, 548) = 2.63, p = .03$, partial $\eta^2 = .02$, drug use, $F(4, 548) = 3.88, p < .001$, partial $\eta^2 = .03$, risky sexual behavior, $F(4, 548) = 36.03, p < .001$, partial $\eta^2 = .21$, social support, $F(4, 548) = 10.12, p < .001$, partial $\eta^2 = .07$, and problem alcohol use, $F(4, 548) = 4.13, p < .001$, partial $\eta^2 = .03$. More specifically, post hoc analyses indicated single-not-in-a-relationship participants scored higher than the other groups with regard
to depression. Additionally, the married/partnered/cohabitating participants scored higher than the other groups with regard to drug use, risky sexual behavior, and social support. Furthermore, single-casually-dating participants scored higher than the other groups with regard to problem alcohol use.

Due to the patterns that emerged from the whole-sample post-hoc tests, I dichotomized the current relationship status groups into “married/partnered/cohabitating” and “all other statuses.” I then re-ran a one-way MANOVA with current relationship status, dichotomized, as the independent variable (i.e., 0 = all other statuses and 1 = married/partnered/cohabitating). The MANOVA finding using Wilk’s lambda was significant for current relationship status, $F(7, 531) = 4.25, p < .001$, partial $\eta^2 = .09$. At the univariate level, the specific dependent variables that varied by current relationship status, dichotomized, were illicit drug use, $F(1, 537) = 4.23, p = .04$, partial $\eta^2 = .01$ and risky sexual behavior, $F(1, 537) = 18.17, p < .001$, partial $\eta^2 = .03$, with the married/partnered/cohabitating group reporting higher rates of illicit drug use and risky sexual behavior than the all other statuses group.

For the athlete-only sample regarding current relationship status, the MANOVA finding using Wilk’s lambda was significant, $F(32, 525) = 2.45, p < .001$, partial $\eta^2 = .12$. At the univariate level, the specific dependent variables that varied by current relationship status were risky sexual behavior, $F(1, 154) = 7.75, p < .001$, partial $\eta^2 = .17$ and social support, $F(4, 149) = 3.47, p = .01$, partial $\eta^2 = .09$. More specifically, post hoc analyses indicated married/partnered/cohabitating participants scored higher than the other groups with regard to risky sexual behavior and social support.

I then re-ran a one-way MANOVA with current relationship status dichotomized (i.e., 0 = all other statuses and 1 = married/partnered/cohabitating) as the independent variable. The
MANOVA finding using Wilk’s lambda was significant for current relationship status, $F(7, 146) = 2.55, p = .02$, partial $\eta^2 = .11$. At the univariate level, the specific dependent variable that varied by current relationship status was risky sexual behavior, $F(1, 537) = 6.12, p = .01$, partial $\eta^2 = .04$, with the married/partnered/cohabitating group reporting higher rates of risky sexual behavior. Due to the effect sizes for current relationship status being at or above the level of medium effect size (i.e., .09), I controlled for current relationship status in my regression analysis for risky sexual behavior.

Based on these findings, I used a dichotomized version of current relationship status (i.e., 0 = all other statuses and 1 = married/partnered/cohabitating) in my MANCOVA to address RQ1. In addition, I used the same dichotomized version of current relationship status in my regressions for risky sexual behavior and illicit drug use (i.e., RQ3 & RQ4).

In summary, the covariates for the MANCOVA to address RQ1 were BMI, age, GPA, and relationship status. The covariate for the ANCOVA to address RQ2 was BMI. Regarding RQ3 and RQ4, I controlled for BMI and GPA in the regression for problem alcohol use. I controlled for relationship status in the regression for illicit drug use. And finally, I controlled for age and relationship status in the regression for risky sexual behavior.
VITA

Samuel L. Nekvasil

EDUCATION

Purdue University, West Lafayette, IN
Doctor of Philosophy, Counseling Psychology
Expected Completion: August 2018
Title of Dissertation: *College Students and Athletes: Identity Adherence, Injury, Illness, Depression, Social Support, and Problem Behaviors*
  ➢ Defended on May 4, 2018

Purdue University, West Lafayette, IN
Master of Science in Education, Counseling
August 2015

Maranatha University, Watertown, WI
Bachelor of Science, Social Studies Education with concentrations in Psychology and Economics
Magna Cum Laude
May 2009

Teaching Credentials
  ➢ State of Wisconsin Certified Teacher, Grades 6-12

CLINICAL EXPERIENCE

Location: James H. Quillen Veterans Affairs Medical Center (March 2018-Present)
Position: Doctoral Internship: Hospice and Palliative Care, Major Rotation
Supervisors: Chris Adler, Ph.D., HSPPP
Description: Internship experience conducting therapy and consultation for Veterans and their families at the end of life. Supervision emphasized gaining knowledge of various approaches to working with this specific population, including an Existential theoretical approach. Skills for building rapport during a difficult time for the Veterans and their families were emphasized, as was conducting needs-based interventions and maintaining/completing paperwork. Working alongside medical care providers was an additional skill that was emphasized in this rotation. Accumulation of 152 hours and ongoing.

Location: James H. Quillen Veterans Affairs Medical Center (November 2017-February 2018)
Position: Doctoral Internship: Primary Care Mental-Health Integration, Major Rotation
Supervisors: Amy Karbasi, Psy.D., HSPPP
Description: Internship experience conducting curbside consultation and brief individual and group therapy with various presenting concerns (e.g., anxiety, tobacco cessation, depression, drug dependence, life adjustment, etc.) and providing co-located, collaborative care. Supervision emphasized gaining knowledge of various medical conditions and medications, conceptualization of clients, formation of empirically-supported interventions, and development of rapport with diverse clientele. Furthermore, skills for
conducting brief, time-limited interventions, writing succinct diagnostic reports, and maintaining/completing paperwork required were emphasized. Accumulated 202 direct contact hours.

**Location:** James H. Quillen Veterans Affairs Medical Center (July 2017-December 2017)

**Position:** Doctoral Internship: Heath and Behaviors, Minor Rotation

**Supervisors:** Julie Culligan, Ph.D., HSPP

**Description:** Internship experience conducting therapy with a broad range of individuals with various presenting concerns (e.g., health coaching for adult-onset obesity, poorly managed diabetes, hypertension). Supervision emphasized conceptualization of clients, conducting group therapy to emphasize a healthy lifestyle, formation of empirically-supported interventions, and development of rapport with diverse clientele by using culturally sensitive and values-based behavioral interventions. Furthermore, skills for writing and conducting structured bariatric surgery evaluations, and maintaining/completing paperwork were emphasized. Accumulated 126 direct contact hours.

**Location:** James H. Quillen Veterans Affairs Medical Center (July 2017-October 2017)

**Position:** Doctoral Internship: Post-Traumatic Stress Program, Major Rotation

**Supervisors:** Meagan McPherson, Psy.D., HSPP

**Description:** Internship experience conducting therapy with a broad range of Veterans who had been diagnosed with Post-Traumatic Stress Disorder (PTSD) or were referred for diagnostic testing and screening for PTSD. Assessments given were: 1) Clinician-Administered PTSD Scale for DSM-5 (CAPS-5), 2) The Patient Health Questionnaire (PHQ-9), 3) Drug Abuse Screening Test (DAST-10), 4) Alcohol Use Disorders Identification Test (AUDIT), 5) Personality Assessment Inventory (PAI), PTSD Checklist for DSM-5 (PCL-5), and The Minnesota Multiphasic Personality Inventory (MMPI-2). Supervision emphasized assessment skills, delivery of clinical interview skills, formation of empirically-supported interventions, and development of rapport with diverse clientele. Furthermore, skills for writing structured assessment reports, and maintaining/completing required paperwork were emphasized. Accumulated 198 direct patient contact hours.

**Location:** Wabash Valley Alliance (August 2015-May 2016)

**Position:** Doctoral Practicum: Community Mental Health

**Supervisors:** Cathy Streifel, Ph.D., HSPP; Jim Noll, Ph.D., HSPP

**Description:** Practicum experience conducting therapy with a broad range of individuals with various presenting concerns (e.g., anxiety, depression, life adjustment). Supervision emphasized conceptualization of clients, formation of empirically-supported interventions, and development of rapport with diverse clientele. Furthermore, skills for writing structured intake reports and maintaining/completing paperwork required for insurance companies were emphasized. Accumulated 337 direct contact hours.

**Location:** Danville Veteran’s Administration (August 2014-May 2015)

**Position:** Doctoral Practicum: Neuropsychology Unit

**Supervisors:** Dongwook Lee, Ph.D., ABPP; M. Carole Pistole, Ph.D., HSPP

**Description:** Practicum experience conducting neurocognitive assessments with military veterans. Supervision emphasized the accumulation of skills necessary to administer and score neuropsychological assessments. Additionally, writing integrated reports, synthesizing all relevant information, and administering feedback sessions were emphasized. Accumulated 242 direct contact hours.

**Location:** Purdue Counseling and Guidance Center (August 2013-May 2014)
Position: Doctoral Practicum: Purdue Counseling and Guidance Center  
Supervisors: Eric Deemer, Ph.D.; M. Carole Pistole, Ph.D.  
Description: Practicum experience working with college students and community members in an on-campus clinic. Supervision emphasized the cognitive behavioral and interpersonal approach to therapy. Accumulated 98 direct contact hours.

Location: By Remembering I Develop and Grow (BRIDGe) Program, Purdue University (February 2013-May 2013)  
Position: Group Co-Facilitator  
Supervisors: Heather L. Servaty-Seib, Ph.D., HSPP  
Description: Co-facilitated eight week-grief and bereavement group for families in the Greater Lafayette area. Accumulated 12 direct contact hours.

TEACHING EXPERIENCE

2016-2017  EDPS105: Exploratory Studies  
Career Exploration, First-year and transfer college students  
Purdue University  
West Lafayette, IN

2010-2012  Social Studies Teacher, Grades 9-12  
Faith High School  
Lafayette, IN

2010-2012  Head Coach of Girls’ Varsity Soccer  
Faith High School  
Lafayette, IN

2009-2010  General Education Teacher  
Professional Education Services Group  
Berrien County, Michigan

RESEARCH EXPERIENCE

2014-2016  Science Learning through Engineering Design (National Science Foundation Grant)  
Purdue University  
PI: Todd Kelley, Ph.D.  
➢ Coordinated the collection and distribution processes of IRB materials and pre/post test assessments for over 110 elementary classrooms culminating in approximately 3500 student participants  
➢ Coded and entered the collected data  
➢ Delegated responsibilities to undergraduate students

2012-2016  Effects of Cancer Perceptions among College-Aged Populations  
Purdue University  
PI: Heather Servaty-Seib, Ph.D., HSPP  
➢ Co-authored journal article; conducted data analyses and wrote the introduction, results, and discussion sections  
➢ Submitted publication to Journal of American College Health
2011-2012 Working Memory and Creativity in Twice Exceptional Learners
Purdue University
PI: Sydney Zentall, Ph.D.
➢ Scored Woodcock Johnson measures
➢ Assisted in data analyses and report writing

2006-2009 Cognitive and Emotional Development of Adolescents
Maranatha University
PI: David Handyside, Ph.D.
➢ Observed, collected, and analyzed qualitative data on the cognitive and emotional developments for students ages 5-18
➢ Developed strategies for educator interventions based on students’ cognitive and emotional developmental level

EMPLOYMENT

Location: Science Learning through Engineering Design (January 2017-May 2017)
Position: Graduate Research Assistant
Supervisor: Todd Kelley, Ph.D. and Chell Nyquist, M.S.
Description: Coded and entered collected data for approximately 3500 student participants.

Location: Purdue University, Exploratory Studies (August 2016-December 2016)
Position: Graduate Assistant/Teacher
Supervisor: Colleen Brown
Description: Taught career exploration class for two sections throughout the fall semester. Conducted class for over 50 individuals. Presented lesson plans, created assignments and projects, and graded those assessments throughout the year.

Location: Science Learning through Engineering Design (August 2014-August 2016)
Position: Graduate Research Assistant
Supervisor: Todd Kelley, Ph.D.
Description: Coordinated IRB and pre- and post-test assessment distribution and collection processes for over 110 elementary school classes culminating in approximately 3500 student participants. Coded and entered the collected data.

Location: Academic Student Success Center, Purdue University (August 2013-May 2014)
Position: Graduate Assistant, Student Mentor and Academic Coach
Supervisor: Antwione Haywood, Ph.D.
Description: Assessed college students’ schedules and goals for the semester and aided them in creating a plan to meet their goals. Created workshops for undergraduate and graduate students in order to help them with academic challenges, such as procrastination and test anxiety.

Location: Academic Student Success Center, Purdue University (August 2012-May 2013)
Position: Graduate Assistant, Director of Online Mentoring for Success
Supervisor: Antwione Haywood, Ph.D.
Description: Created an online program to assist students in meeting classroom requirements and deadlines. Hired and supervised undergraduate student staff.

Location: Gifted Education Resource Institute, Purdue University (July 2012)
Position: High School Counselor
Supervisor: Matt Fugate, Ph.D.
Description: Counseled high school-aged boys in gifted education programs for a two-week period on issues such as identity, school bullying, racism, LGBTQ, and self-concept.

OUTREACH

- Developed and presented three-hour sexual assault prevention workshop for men in the community, mainly from rural areas

- Developed and coordinated a tree climbing clinic for inner-city adolescents ages 13-16 from low SES communities
- The focus of the workshop was to help the adolescents form connections with healthy activities

- Assisted in developing and presenting a workshop that aided high school students and their families with completing their Free Application for Federal Student Aid.

PRESENTATIONS & PUBLICATIONS


Servaty-Seib, H. & Nekvasil, S. L. (2013) *Cancer-related health behaviors of college students: Race, sex, cancer perception, and family communication.* American Psychological Association (APA) Annual Convention, Atlanta, GA.

PROFESSIONAL SOCIETY MEMBERSHIPS

2014-Present Association of Death Education and Counseling (ADEC)

2012-Present American Psychological Association, Division 17 (APA)

SERVICE

2013-2017 Treasurer for the Student Society of Arborists, Purdue University, West Lafayette, IN

2012-2013 Secretary for Counseling and Development Student Program, Purdue University, West Lafayette, IN

2011-2012 Chair of the Committee to begin an AP Psychology course at Faith High School, Lafayette, IN
2008-2009  Student Body President at Maranatha University, Watertown, WI
2005-2009  Volunteer in children’s program helping ESL students in Watertown, WI
2005-2006  Volunteer in oncology unit at Memorial Hospital in South Bend, IN

AWARDS
2016      Bruce Shertzer Graduate Scholarship in Counseling
2016      Purdue University College of Education Research Grant
2015      Center for Loss & Life Transition Travel Grant
2014      Association of Death Education & Counseling Annual Conference Travel Grant
2013      Purdue University College of Education Travel Grant