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Sport psychology strategies, types of social support, and adherence to injury rehabilitation among university student-athletes

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Sport Psychology Strategies, Types of Social Support, and
Adherence to Injury Rehabilitation among University Student-Athletes

by

Kenneth Tubilleja

A Dissertation Submitted to the
College of Human Resources and Education at
West Virginia University

in partial fulfillment of the requirements
for the degree of

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in
Counseling Psychology

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Student-Athletes, Athletic Injury, Rehabilitation

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Abstract

Sport Psychology Strategies, Types of Social Support, and Adherence to Injury Rehabilitation among University Student-Athletes

Kenneth Tubilleja

The present study examined differences between levels of adherence to athletic injury rehabilitation (SIRAS; Brewer, Van Raalte, Petitpas, Sklar, & Ditmar, 1995) among injured student-athletes on their use of sport psychology strategies (TOPS; Thomas, Murphy, & Hardy, 1999) and their perceived social support (SSS-C; Richman, Rosenfeld, & Hardy, 1993). Relationships between adherence to athletic injury rehabilitation and sport psychology strategies and perceived social support were also investigated. In addition, participants' use and training in sport psychology strategies was explored. The sample consisted of 35 student-athletes from 1 NCAA Division I and 3 Division II institutions who sustained athletic injuries that required them to receive treatment at an athletic training room for at least ten sessions or two weeks. Participants attended an average of 42 sessions. Injuries ranged from ankle sprains to ACL tears. Participants represented 9 sports with a balanced number of female (n=19) and male (n=16) student-athletes. No significant differences were found between low and high groups on adherence to athletic injury rehabilitation on TOPS Competition scores for self-talk, goal setting, imagery, and relaxation; and the following SSS-C types of social support: Listening, emotional, emotional challenge, reality confirmation, task appreciation, and task challenge. No significant positive relationships were found between SIRAS scores and scores for sport psychology strategies and types of social support. A greater proportion of participants were found to use several sport psychology skills in both competition and rehabilitation, but not to have received formal training in these skills. No differences in proportion of participants were found to use these skills because of differences in SIRAS level, gender, class-status, or severity of injury. Additional analyses revealed significant differences between NCAA Division I and II participants with Division II student-athletes scoring higher on TOPS Competition scores for self-talk, goal setting, and relaxation. The results of this study are discussed and explained. Implications for interventions addressing injured student-athletes' sport psychological and social support needs are provided. Limitations of this study are shared and directions for future research are offered.

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Dedication

I dedicate this dissertation and all of the years I have spent in higher education to my father. A man who sacrificed completing his college education, so that he could take care of and support his family. To my Dad:

Joseph C. Tubilleja

December 30, 1931 – January 19, 1993

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Chapter 1

Introduction

Approximately 50% of all sport participants will be injured at some point, and at least half of these injuries will be attributed to overuse, such as rotator cuff tears, Achilles tendonitis, and stress fractures (Barry & McGuire, 1996). Injuries of the anterior cruciate ligament (ACL) are increasingly more prevalent. According to Barry and McGuire (1996), there are an average of 2.4 ACL ruptures that occur for each American college football team per year. In addition, over 100,000 ACL injuries are estimated to occur in skiing each year. Along with the physical damage from an injury, psychological trauma may result as well. Lynch (1988) has reported that severely injured athletes may go through emotional stages of denial, anger, bargaining, depression, and acceptance. Although empirical evidence has not been found to support the notion athletes go through orderly stages of grief due to injury, it is apparent that an injury can cause significant life stress among athletes (Passer & Seese, 1983).

The psychological aspects of athletic injuries have drawn increasing interest from researchers in sport psychology and sport medicine. A reflection of this interest is the publication of edited books that have explored in great depth the subject of the psychology of sport injury (Heil, 1993a; Pargman, 1993). Two areas that have led to significant, but limited, research in the study and treatment of athletic injury are psychological or mental skills training and social support, because of their apparent utility in successful rehabilitation of sport injuries (Hardy & Crace, 1993; Ievleva & Orlick, 1993) and adherence to athletic injury rehabilitation (Duda, Smart, & Tappe, 1989; Fisher & Hoisington, 1993).

Separate bodies of research have been accumulated on the effects of mental skills training on athletic injury rehabilitation (Davis, 1991; Ievleva & Orlick, 1991; Ross & Berger, 1996) and

the effects of social support on athletic injury rehabilitation and adherence (Duda, Smart, and Tappe, 1989; Hardy, Richman, & Rosenfeld, 1991; Petrie, 1993; Rider & Hicks, 1995). Some rehabilitation intervention studies have used a variety of treatments, which include biofeedback, goal setting, relaxation, stress-inoculation, and guided imagery (Cupal, 1998). Durso-Cupal (1996) provided sessions of relaxation and guided imagery for individuals suffering anterior cruciate ligament injuries. The intervention group showed greater gains in strength, degrees of extension, significant decrease in reinjury, and less state anxiety at 24 weeks post surgery compared to individuals in a control group.

According to Hobfoll and Stephens (1990), social support provides needed resources that can help individuals cope with the stress of injury by: a) providing a feeling of attachment to others, b) directly preventing or limiting resource loss, c) providing for resources that are lost, and/or d) activating latent resources. The positive impact of social support on rehabilitation has been documented with patients suffering chronic obstructive pulmonary disease (Grodner, Prewitt, Jaworski, Myers, Kaplan, & Ries, 1996), brain injuries (Kaplan, 1990), burn wounds (Davidson, Bowden, Tholen, James, & Feller, 1981), and orthopedic injuries (Ponzer, Molin, Johansson, Bergmann, & Tornkvist, 2000). Social support can also benefit athletes. Athletic trainers have reported that athletes who cope most successfully with injury rehabilitation have high social support (Wiese, Weiss, & Yukelson, 1991). It is apparent that both psychological skills and social support can have a positive impact on injury rehabilitation and adherence.

Unfortunately, to date, few studies are available that have investigated what types of sport psychology strategies and what types of social support are related to adherence to athletic injury rehabilitation. An exploration in this area would assist in the development of psycho-educational programming to help injured athletes with their recovery. It would also encourage

further research to determine if particular relationships exist between types of sport psychology strategies and social support and rehabilitation outcome. Clearly, empirical support is needed before consistent and effective psycho-educational programs are developed and initiated at intercollegiate athletic training facilities and sports medicine clinics.

A program had been developed, at John F. Kennedy University in Orinda, California, to improve the psychological health of the injured athlete by supporting the individual both mentally and physically (Granito, Hogan, & Varnum, 1995). The primary focus of the program, which was called the Performance Enhancement Group (PEG), was to teach a number of psychological skills that will help facilitate athletic injury rehabilitation. In addition, PEG was structured to provide time for athletes to share their experiences with other members and receive support from the group. Although the program appeared to be successful from the informal feedback received from participants and the number of referrals by PEG members, no empirical data was available to support this notion. Initiating a study that measures the acquisition of psychological skills and the existence of social support in such a program would seem like a logical step to take to find empirical support for the utility of PEG and other similar groups developed for injured athletes. However, investigating the sport psychology strategies and types of social support that would have the greatest impact on injury rehabilitation and adherence would be a preliminary step.

The purpose of this study was to investigate the relationship between sport psychology skills, types of social support, and adherence to rehabilitation. Participants' use of sport psychology strategies during competition and rehabilitation and their experience with formal training in sport psychology was examined. Outcome of rehabilitation was not included in this study due to challenges in measuring successful rehabilitation and constraints in time.

Statement of the Problem

Although, a positive relationship between social support and rehabilitation outcome and adherence has been documented (Duda, Smart, & Tappe, 1989; Hardy, Richman, & Rosenfeld, 1991; Petrie, 1993; Rider & Hicks, 1995) results from other studies have contradicted these findings (Brewer, 2001). It has been suggested that these inconsistent findings have occurred because of the ways social support and rehabilitation have been measured (Brewer, 2001). In addition to social support, sport psychology skills have been investigated as predictors and interventions for injury rehabilitation and adherence. Goal setting, positive self-talk, and imagery were found to be positively related to healing among sports medicine clinic patients (Ievleva & Orlick, 1991). Being goal directed and self-motivated were related to adherence among college athletes (Duda et al., 1989). Anecdotal evidence was gained that suggested skills such as goal setting, relaxation, imagery, improved concentration, centering, time-management skills, and positive self-talk can have an impact on injury rehabilitation when used in a group setting (Granito et al., 1995). However, no studies to date have looked at the relationship between a comprehensive set of sport psychology skills and adherence to rehabilitation. This added to inconsistent findings regarding the relationship between social support and athletic injury rehabilitation led to the purpose of this study. Before proceeding, it must be noted that although adherence to rehabilitation is not the same as rehabilitation outcome, adherence is an appropriate variable to investigate. Adherence to sport injury rehabilitation has been reported to be positively related to rehabilitation outcome and that failure to comply with athletic injury rehabilitation can have a negative impact on rehabilitation outcomes (Brewer, 2001).

Purpose of Study

The purpose of the present study was to investigate the relationships between sport psychology strategies, types of social support, and adherence to athletic injury rehabilitation among intercollegiate athletes. More specifically, an examination of the difference between injured athletes that were classified as either low or high on adherence on reported levels of sport psychology behaviors and social support was performed. Observations on the effect of adherence level on specific sport psychology strategies and types of social support were made as well. Participants' use of sport psychology strategies during competition and rehabilitation and their experience with formal training in sport psychology was also examined. It was expected that the results of this study would provide information useful in developing programs that attempt to meet the sport psychology and social support needs of injured athletes undergoing injury rehabilitation.

Key Terms

Social support. This construct can be viewed as a type of social commerce that can be exchanged like other resources between a minimum of two people (Hardy & Crace, 1993). The outcome of this exchange was seen as being the enhancement of the recipient's well-being. In addition, these resources include the provision of emotional, informational, and tangible support. Social support was operationally defined as the scores participants received on the Social Support Behaviors Survey-Clinical Form (SSS-C; Richman, Rosenfeld, & Hardy, 1993) (See Appendix C) for the following subscales (listening support, emotional support, emotional challenge support, reality confirmation support, task appreciation support, and task challenge support).

Sport Psychology Strategies. The degree of possessing psychological skills or sport psychology strategies was operationally defined as the score participants received on the Test of Performance

Strategies (TOPS; Thomas, Murphy, & Hardy, 1999) for the Competition subscale and included the following psychological skills and strategies: goal setting, imagery, relaxation, and self-talk. Participants' use of all the strategies assessed with the TOPS was examined with the inclusion of three close-ended questions (See Appendix E) and included strategies listed above and negative thinking, attentional control, emotional control, activation, and automaticity. A brief definition of all sport psychology strategies examined in this study is offered.

Attentional control. A technique that involves the focusing of attention upon an immediate task. It is also a learned skill that emphasizes not reacting to or not being distracted by unimportant internal or external stimuli (Schmid & Peper, 1998). Thus, concentration training is the use of techniques to help an individual focus their attention on a current task.

Goal setting. A technique in which an individual or group attempts to reach a specific standard of proficiency on a task, usually within a specific time limit (Gould, 1998).

Imagery training. A technique that involves exercises using all senses to create images that approximate motoric movements in order to prepare for actual physical practice or performance. Imagery can be used to effect emotional responses as well such as anxiety, anger, and pain (Vealey & Walter, 1998).

Relaxation and activation. These skills refer to arousal management involving cognitive-behavioral techniques used to attain optimal arousal level for competitive events such as relaxation and/or energizing exercises (Landers & Boutcher, 1998).

Self-talk. Cognitive technique used to build confidence and enhance performance through the use of personal, cognitive dialogue (Zinsser, Bunker, & Williams, 1998). Positive self-talk is reported to contribute to personal well-being and can be used to focus on healing by learning how to control thoughts about injury and recovery (Ievleva & Orlick, 1991).

Emotional control. This technique is seen as a skill that involves a person being able to cope with their emotions or affect so that it does not interfere with their performance (Murphy, 1996).

Negative thinking. Although this is not necessarily a technique, this construct refers to how one handles negative emotions, thoughts, and behaviors as they are related to one's athletic performance (Thomas, et al., 1999).

Automaticity. This construct reflects a person's ability to perform at a high standard without actively thinking about what they are doing (Csikszentmihalyi, 1990).

Adherence to athletic injury rehabilitation. Fisher (1999) defined adherence as the "degree of commitment an individual makes to a particular goal" and added that it involves compliance with instructions and suggestions to reach that goal. Adherence will be assessed by asking head athletic trainers to complete a measure of adherence to injury rehabilitation, called the Sport Injury Rehabilitation Adherence Scale (SIRAS; Brewer, Van Raalte, Petitpas, Sklar, & Ditmar, 1995) (See Appendix B). This scale assesses participants' intensity of treatment completion, frequency of following instructions and advice, and receptivity to changes in a treatment program.

Research Questions

A number of questions were developed to form the basis of this study. First, what relationships exist between adherence to athletic injury rehabilitation and sport psychology skills; and what relationships exist between adherence to athletic injury rehabilitation and social support? Is adherence related to specific sport psychology strategies and specific types of social support? Next, are there differences between individuals low or high in adherence on the degree of sport psychology skills they report to use and the amount of social support they report to

receive? Do these differences depend on specific sport psychology strategies or specific types of social support? Lastly, do differences exist in proportions of the population sampled when examining their use of sport psychology strategies in competition and rehabilitation and whether or not they had been formally trained in such skills?

Summary

Athletic injuries continue to pose challenges for those who have been injured and for those who attempt to provide interventions designed to meet the physical and psychological needs of injured athletes. Interventions involving sport psychology skills and social support may prove to be helpful in facilitating increased adherence to athletic injury rehabilitation and outcome. However, questions remain about the relationship between adherence to athletic injury rehabilitation and sport psychology strategies and social support. The primary purpose of this study was to examine these relationships and to determine if certain sport psychology strategies and types of social support are more strongly related to adherence.

Chapter Two

Literature Review

Injury can have a profound impact on a person's ability to function. There are a number of psychological factors that influence how a person copes in a general sense and how they respond to rehabilitation of their injury. The presence of social support and the teaching of psychological skills may facilitate positive outcomes for injured individuals with concern to their rehabilitation and their overall well being. This chapter will address these issues by first reviewing the prevalence of certain types of injuries in the general population and then the prevalence of injury among athletic populations. An examination of psychological factors associated with injury and rehabilitation will be done followed by a review of social support and its utility with athletic injury rehabilitation. The utility of psychological skills with athletic injury rehabilitation will also be addressed. And lastly, adherence to athletic injury rehabilitation will be reviewed.

Injury Prevalence

Injuries, particularly accidental ones, take many forms. They occur while traveling in cars, trains, buses, ships, or in planes. Accidents that result in injuries also occur from falls, participation in sports, occupational tasks, and home activities. The annual rate of injuries in the United States is significant. In 1985, approximately 57 million Americans were injured (Scotti et al., 1995) and in this figure there were 143,000 deaths, 2.3 million hospitalizations, and 54 million injuries not requiring hospitalization. The leading cause of injury resulting in hospitalization, according to Scotti et al. (1995), was due to falls (33.4%). This was followed by motor vehicle accidents, which accounted for 22.3% of accidental injuries.

Spinal cord injury and brain injury are two specific types of trauma that are among the injuries noted above. It is estimated that there are about 180,000 to 230,000 individuals who live with a spinal cord injury in the United States (Stover, 1996) and that there are an additional 7,000 new cases each year (Elokda, Nielsen, & Shields, 2000). The incidence of traumatic brain injury (TBI) has been estimated to be 200/100,000 of the population with approximately 1.9 million Americans suffering a TBI annually (Rosenthal & Ricker, 2000). It is also estimated that 50,000 to 75,000 people experience moderate to severe disability resulting from a TBI. The incidence of injury in sport is discouraging as well.

Injury prevalence in sport. According to the National Hospital Ambulatory Medical Care Survey compiled for data between 1997 and 1998, there is an estimated annual average of 2.6 million emergency visits for sport-related injuries for 5 to 24 year olds in America (Burt & Overpeck, 2001). Persons of all ages accounted for a total annual average of 3.7 million sport-related injuries treated by emergency departments. The National Health Interview Survey, conducted annually by the National Center for Health Statistics, presented greater injury rates for the United States population (Conn, Annett, & Gilchrist, 2003). This survey, which used data between 1997 and 1999, resulted in an estimated annual average of 7 million people receiving medical attention for sport-related injuries. The higher estimate was due largely to the fact that data was gathered by including incidences of injuries that led to participants receiving any type of medical attention from any health care provider (Conn et al., 2003).

The National Collegiate Athletic Association (NCAA, 2000) formed an Injury Surveillance System (ISS) in 1983 to provide current and reliable data on injury trends in intercollegiate athletics. Unfortunately, the NCAA does not identify every injury that occurs at NCAA institutions. Rather, it collects a sampling of “reportable injuries” of a national cross

section of member institutions. A reportable injury in the ISS is defined as one that: 1) occurs as a result of participation in an organized intercollegiate practice or game; 2) requires medical attention by a team athletic trainer or physician; and 3) results in restriction of the student-athlete's participation for one or more days beyond the day of injury. It is also important to note that the ISS defines injury rate as a ratio of the number of injuries in a particular category to the number of athlete exposures in that category. This value is expressed as injuries per 1,000 athlete exposures. So, for example, 10 reportable injuries during a period of 500 athlete exposures would give an injury rate of 20 injuries per 1,000 athlete exposures $[(10 \text{ divided by } 500) \times 1,000]$ (NCAA, 2000).

In a recent report the NCAA (2000) detailed the 1998-1999 season that included baseball, field hockey, football (spring football also), men's ice hockey, softball, women's volleyball, wrestling, men's and women's basketball, gymnastics, lacrosse, and soccer. There was an average practice injury rate of 4.4 injuries per 1,000 athlete exposures, an average game injury rate of 13.4, an average "severity" practice injury rate of 1.5 that led to restricted or missed participation for seven or more days, and an average "severity" game injury rate of 4.4 that led to restricted or missed participation for seven or more days. In addition, there was an average practice injury rate requiring surgery of .27 and an average game injury rate requiring surgery of 1.91. Parts of the body injured and types of injuries varied according to sport (NCAA, 2000). In football, the knee, ankle, upper leg, and shoulder were the most injured body parts resulting primarily from sprains, strains, and contusions. In women's volleyball, the ankle, knee, and shoulder were the most injured body parts resulting primarily from sprains, strains, tendonitis, and contusions. A detailed description of types of injuries and body parts injured in several other

NCAA college sports is available through annual reports sponsored by the NCAA and made available through its website.

In less abstract, detailed terms, it was reported that nearly 50% of all NCAA Division I student-athletes had experienced an athletic-related injury (Tunick, Etzel, Leard, & Lerner, 1996). It was also noted that a significant number of the participants in this study reported that they felt “intense” or extremely intense” pressure to ignore their physical problems. Intense pressure or stress is one of many factors that impact psychological response to and rehabilitation of sport injuries.

Psychological Models and Injury

Psychological model of response to injury. Recent models of response to accidental injury have attempted to understand individuals’ response to injury when it results in posttraumatic stress disorder (Scotti et al, 1995). A “dynamic, heuristic” model of accident-related PTSD has been outlined by Scotti and his colleagues (1995) that attempted to integrate biological, psychological, and social variables into a comprehensive framework. The model involves six elements that include: 1) original learning, 2) accident/trauma learning, 3) unlearned/genetic biological vulnerability, 4) present situation, 5) acquired/learned biological vulnerability, 6) psychological vulnerability, and 7) present symptomatic responses. According to the authors of this model multiple factors, such as behavioral, biological, and environmental factors; interact with each other over time in a reciprocal manner. They suggest that deficient and inappropriate personality or skills, which fall under psychological vulnerability, interact with biological vulnerability and environmental stressors that lead to PTSD symptoms. To elaborate on this model, original learning (i.e., historical antecedents) may involve sexual, physical, or emotional abuse, an alcoholic home, family psychiatric history, and no contingent punishment.

Accident/trauma learning involves the nature of the accident (sudden, unpredictable), extent of personal injury, exposure to injury of others, blame by self and others, and low social support. Unlearned/genetic biological vulnerability takes into consideration an individual's genetic predisposition, their high autonomic resting levels, hyper-arousability, and somatic complaints. The conditions included under present situations (i.e., current antecedents) are stimulus triggers reminiscent of the accident, interpersonal or physical anxiety provoking situations, and low social support. Acquired/learned biological vulnerability involves an individual's conditioned autonomic arousal, high basal blood pressure and heart rate, increased autonomic and neurochemical reactivity and endogenous opioids, low urinary cortisol levels, and depleted norepinephrine levels. Psychological vulnerability is partitioned into three categories: 1) emotional-motivational (intense emotional arousal); 2) language-cognitive (for example, selective attention to threat cues); and 3) sensory-motor (for example, avoidance of threat situations). Present symptomatic responses are also broken down into similar categories: 1) emotional-motivational and physiological (irritability, hostility, anger); 2) language-cognitive/covert behavior (avoidance of aversive memories); and 3) sensory-motor (restlessness). This model takes into account a great many variables and is an attempt to integrate biological, psychological, and social factors to better understand the psychology of individuals' response to injury. Similar models are found to explain the psychology of athletic injuries.

Psychological models of athletic injury rehabilitation. Previous models of athletic injury have examined the relationship between stress and athletic injury (Andersen & Williams, 1988). These models have attempted to create a framework for assessing the risk of injury and for suggesting ways to reduce the likelihood of injury to athletes. The purpose of this study is to determine the efficacy of an intervention post athletic injury. Thus, a model designed to prevent

injuries from occurring in the first place is not particularly relevant to the current study.

Fortunately, models of sport injury rehabilitation that address pre and post injury factors have been constructed.

Like the heuristic model described previously (Scotti et al., 1995), a biopsychosocial model of sport injury rehabilitation was recently developed and described by Brewer (2001). The model includes seven components: 1) characteristics of the injury, 2) socio-demographic factors, 3) biological factors, 4) psychological factors, 5) social/contextual factors, 6) intermediate biopsychological outcomes, and 7) sport injury rehabilitation outcomes. This biopsychosocial model provides a detailed, broad structure to examine the process of sport injury rehabilitation. It also offers explanations for how psychological factors can affect the outcomes of sport injury rehabilitation. However, according to Brewer et al. (2001), it does not yet explain relationships among specific psychological factors and it does not directly include the influence of social support or psychological skills training to sport injury rehabilitation.

An inclusive model that integrates stress's role in injury and one that integrates psychological and sociological factors is found in Wiese-Bjornstal, Smith, Shaffer, and Morrey's (1998) integrated model of psychological response to sport injury and rehabilitation. According to this model, responses to injury are influenced by both pre-injury factors and post injury factors. Pre-injury factors include personality, history of stressors, coping resources, and interventions. These factors can have a direct impact on an individual's stress response leading to injury and it can impact an individual's response after the injury during the rehabilitation process. Coping resources and interventions are two pre-injury factors that are particularly relevant to the present study. Post injury factors, personal factors and situational factors affect the manner in which the injury and the rehabilitation process are cognitively appraised or

interpreted. Personality factors include characteristics of the injury and individual differences that are broken down into three categories: psychological, demographic, and physical. One variable among many under personality factors that is relevant to this study is psychological skills. Situational factors that impact cognitive appraisal are sport, social, and environmental factors. Under social factors it is noted that the provision of social support is one key variable. The model suggests that as both personal and situational factors impact an individual's cognitive appraisal of their injury and the rehabilitation process this interpretation affects three interrelated responses or outcomes. These include: behavioral response (adherence to rehabilitation, use of PST strategies, use/disuse of social support), emotional response (fear of unknown, tension, frustration, positive attitude/outlook, emotional coping), and recovery outcomes (psychosocial and physical) (Brewer, 2001).

In a review of models of psychological adjustment to athletic injury, Brewer (1994) examined the use of stage models and cognitive appraisal models. He examined various stage models of grief and loss that have been developed to explain psychological reactions to athletic injury. Brewer concluded that research has not supported the major claims of stage models. Furthermore, he discussed the empirical support found for cognitive appraisal models in their use of explaining psychological reactions to athletic injury. Brewer praised these models for being able to take into consideration individual differences in response to athletic injury. Brewer (1994) concluded by stating that research on the psychological consequences of athletic injury has much potential for application. Moreover, he showed much foresight when he stated that future research, using cognitive-appraisal models will increase understanding of the factors related to athletic injury and allow for the development of intervention for injured athletes (Brewer, 1994). The utility and flexibility of the cognitive appraisal model by Wiese-Bjornstal et

al. (1998) lends itself quite well to test certain factors, such as social support and psychological skills training, and their impact on injured athletes' recovery outcomes or more specifically their injury rehabilitation.

Psychological Issues and Rehabilitation of Injury

The challenges of adjusting to injury is varied and many among the general population. This is particularly the case when attempting to adjust to such injuries as spinal cord injury, traumatic brain injury, and/or burn injuries. Depression is a common reaction to those who experience life-altering injuries (Frank & Elliott, 2000). Depressive symptoms have been associated with longer hospital stays and fewer improvements during rehabilitation. Depression has also been linked with the occurrence of preventable secondary complications like pressure sores and urinary tract infections (Richards, Kewman, & Pierce, 2000). An effect of depression that must be closely monitored is suicide. It is reported that suicides account for 5-10% of all deaths for people with spinal cord injury (Richards et al., 2000). PTSD is also a common reaction to these injuries, depending on the nature of the injury. The occurrence of PTSD in patients with burn injuries is estimated to be about 30% (Patterson & Ford, 2000). Those with PTSD typically report suffering more pain, have had larger burn areas, expressed more guilt about the precipitating event, and were more likely to experience delirium (Patterson & Ford, 2000). Substance abuse is also an area of concern for those who experience the types of injuries described here. For individuals who have suffered traumatic brain injuries substance abuse is the primary roadblock to successful participation in supported employment programs and job retention (Rosenthal & Ricker, 2000). Although the majority of injured athletes do not have to make similar adjustment or have similar reactions to injury as individuals described above, they also must cope with a variety of psychological issues.

Psychological Issues and Rehabilitation of Athletic Injury. The majority of sport injuries are not as severe as spinal cord injuries or traumatic brain injuries. However, athletes that sustain injuries make significant adjustments as well. At the university level, student athletes who become disabled by injury are affected by a number of limitations. They experience greater difficulty with participating in normal routine activities such as attending classes, practicing and competing with their team, and taking care of personal responsibilities (Tunick et al., 1996). The inability to train and perform is usually followed by a loss of identity especially for those who have a high athletic identity and view their sport participation as their primary or only social role (Brewer, 1993).

It often appears that injured athletes go through a stage like process in their adjustment to their injury. A number of authors have suggested that athletes go through a grief response following injury similar to that of Kubler-Ross's stages of grief in which individuals go move from anger, to denial, to depression, bargaining, and lastly acceptance (Henschen & Shelly, 1993). There is some support for this idea of injury response stages. A study was done that consisted of 30 male athletes who were injured playing football or hockey at the high school, club, or semi-professional level (Crossman, Gluck, & Jamieson, 1995). The participants suffered moderately severe injuries such as groin and hamstring strains and knee sprains that caused them to miss an average 2.5 weeks of participation and practice. The participants were asked to complete questionnaires that asked them to rate their emotions during four stages of their recovery: day of the injury, the following day, halfway through rehabilitation, and day of return to practice. Results indicated that as recovery progressed, participants reported significantly less anger, disgust, and shame and significantly more joy and excitement. Stages of adjustment to injury are not accepted by some researchers though. Brewer (1994), most notably, has argued

against this idea. He states that there is very little empirical support for various stage theories and models to conclude there are discrete, finite reactions to injury. He argues that psychological factors of injury and rehabilitation are best understood with cognitive appraisal models (Brewer, 1994).

Tunick et al. (1996) seem to agree that it is not ideal to try to understand psychological response to athletic injury with a linear stage model that has discrete phases athletes are expected to follow. However, they suggest stage models can be used as a guideline to understand individual's response to injury and as a guide for intervention. They go so far as to propose their own stages of adjustment which include: 1) *Shock*-most often occurring during the first few hours or days after injury. Person may appear confused, dazed, and stunned; 2) *Realization*-athlete begins to become aware that something is wrong. This is often accompanied by anxiety, panic, anger, and depression; 3) *Mourning*-stage unusually involves intense distress, reactive depression, and internalized anger. Feelings of hopelessness and helplessness often occur and potential for clinical depression and suicidal ideation may be present; 4) *Acknowledgement*-here, the athlete begins to cope in a healthy manner and starts to accept their loss of functioning. Depression and anxiety may continue, as person regains a sense of equilibrium; and 5) *Coping and reformulation*-this stage occurs after the athlete gains greater acceptance of the injury. The athlete becomes more active and reconciles the impact of the injury and future implications. Although, regression is expected to occur before the athlete successfully manages their way through the final phase.

Social Support and Injury Rehabilitation

Social support. Several definitions for social support exist. Social support has been defined as being “the subjective feeling of belonging, of being accepted or being loved, of being

needed all for oneself and for what one can do” (Moss, 1973; p. 237 as cited by Hardy and Crace, 1993). Pines and Aronson (1988) suggest that there are six distinguishable forms of social support that help reduce life and work stress. They include: 1) listening support, 2) emotional support, 3) emotional challenge, 4) technical appreciation, 5) technical challenge, and 6) shared social reality. Hardy and Crace (1991) identified two additional forms of social support: personal assistance, which is characterized by the giving of time, skills, knowledge, and expertise to help accomplish tasks; and material assistance, which is characterized by the provision of financial assistance, products, or gifts. In a study that involved college athletes social support was divided into two areas: 1) support that required content expertise (technical appreciation and challenge); and 2) support not requiring such expertise (listening support, emotional support and challenge, and shared social reality) (Rosenfeld, Richman, & Hardy, 1989).

Utility of social support for sport injury rehabilitation. According to Hardy and Crace (1993), when athletes face the stress of injury, they will attempt to minimize losses to their resources. To do this, athletes will use their personal resources. A loss in personal resources can be experienced when an athlete is injured. If there are no effective personal resources, athletes will seek the support of others to assist them as they cope with their injury. Hardy and Crace (1993) cited research that demonstrates how social support can help people cope with stress, crisis, mental and physical illness, unemployment, job stress, bereavement, childbirth, mortality risk, and other stressors. Research has only recently looked at how social support can enhance the treatment and recovery process of injured athletes.

In a qualitative study (Bianco & Orlick, 1996), researchers used an unstructured interview format. Questions were asked to elicit responses from participants about their perceptions of the social support they received during recovery from athletic injuries and the

effect of social support on coping with their injuries. Evidence suggested social support existed at each of the stages of participants' injuries. This social support was determined to have contributed to enhanced coping and increased motivation in physical therapy adherence. In addition, social support was reported to have led to more positive outlook among participants toward their injury and recovery (Bianco & Orlick, 1996).

Duda, Smart, and Tappe (1989) investigated adherence behaviors in an athletic injury rehabilitation setting. The participants were 40 male and female college student-athletes (members of a variety of sport teams) who had sustained a sport related injury. Results indicated that overall adherence to treatment was significantly related to the athlete's perceptions concerning the efficacy of treatment and social support for injury rehabilitation, his/her degree of self-motivation, and task involvement in sport.

In an investigation with male and female high school basketball players the relationships between life-event stress, coping skills, social support, and injuries of the participants was examined (Rider & Hicks, 1995). The participants included 35 boys and 32 girls on eight high school varsity basketball teams. Life events were measured using the Social and Athletic Readjustment Rating Scale (Bramwell, Masuda, Wagner, & Holmes, 1975) and the Athletic Life Experiences Survey (Passer & Seese, 1983). Coping skills were assessed using the Athletic Coping Skills Inventory (Smith, Smoll, & Schutz, 1988). Social support was measured using a scale developed by Smith, Smoll, and Ptacek (1990). Athletic injury was defined as a medical problem resulting from athletic participation that restricted participation for a minimum of one day after the day of injury. Results were computed on 52 participants because of mortality due to data on injuries not being available for 15 girls. Contrary to the authors' hypothesis, the injury measure was significantly and inversely correlated to life-event measures, meaning that as

number of life events increased the rate of injuries decreased. However, no significant inverse correlation was found between the injury measure and coping skills or the social support variables.

Although social support is generally thought to be a positive resource for those suffering from injuries, evidence has been found to show it can be detrimental to athletes (Hardy, Richman, & Rosenfeld, 1991). Hardy and his colleagues investigated the role of social support in the relationship between life stress and injury. Using a prospective design, they recruited 170 (78 males, 92 females) intercollegiate athletes from a NCAA Division I university. The participants represented women's soccer, field hockey, track and field, volleyball, gymnastics, and cross country; and men's track and field, soccer, wrestling, and cross country. A modified version of the Support Functions Questionnaire (Pines, Aronson, & Kafry, 1981) was used to assess participants' level of social support. Participants were asked to indicate how important they perceived six types of social support to be using a 7-point Likert type scale with points ranging from (1) "not at all important" to (7) "extremely important." The Athletic Life Experience Survey (ALES; Passer & Seese, 1983) was used to measure life stress. The ALES has 70 life events using a scale ranging from (+3) "good" to (-3) "bad." Participants were asked to indicate whether they had experienced each listed event and if they had, to indicate its impact. Injury data were obtained from team injury logbooks. Results indicated that life stress and several dimensions of social support were predictive of the frequency of injury among intercollegiate male athletes. However, it was found that as providers of social support increased, injury frequency for male athletes also increased. Hardy, Richman, and Rosenfeld (1991) reasoned that the social support the male athletes received could have been a distraction to their performance and may have increased the probability of injury. It also could have increased performance

motivation and or arousal, which may have put them at risk. For female athletes, no relationship between life events and social support was found.

Another study prospectively examined the direct and moderating effects of life stress and social support on athletic injury in college football players (Petrie, 1993). Petrie (1993) also wanted to determine whether differences existed in injury rates of starters versus non-starters, and if athletes' playing status moderated the utility of life stress and social support as predictors of injury. Participants included 98 athletes on a NCAA Division I-A football team from a major Midwestern university. The Life Events Survey for Collegiate Athletes (LESCA) (Petrie, 1992) was used to measure life stress. Participants were asked to indicate the occurrence of each event and to assess the impact it had by using a 9-point Likert scale (-4, extremely negative to +4, extremely positive). The Social Support Inventory (SSI) (Brown, Alpert, Lent, Hunt, & Brady, 1988) is a 39-item social support questionnaire that uses a 7-point Likert scale (1, not at all satisfied to 7, very satisfied) for each item. Individuals indicated their level of satisfaction with the support they had received over the past month. No direct, moderating or full model effects for positive life stress and social support were found. However, direct and full model effects for negative life stress and social support were found. Results provide support for negative life stress-injury relationship, and moderating effects of social support and playing status. Playing status did moderate the utility of negative life stress and social support as predictors of athletic injury. For starters, significant relationships were found with number of severe injuries, days missed due to injury, and number of games missed due to injury. This suggests that the role of being a starter is stressful in itself. Significant negative life stress by social support interactions was found for the number of severe injuries, number of days missed due to injury, and number of games missed. Also found was a positive correlation between negative life stress and each injury

outcome for low social support (SS) starting football players. A negative correlation between negative life stress and each of the injury outcomes was found for low SS starting football players. Findings support suggestions that social support may serve as a protective function in moderating life stress-injury relationships (Petrie, 1993). It remains unclear what effect social support has on rehabilitation of athletic injuries. Equally unclear is what relationship there may be between the application of psychological skills training and social support on athletic injury rehabilitation.

Psychological Skills and Injury Rehabilitation

Psychological Skills. When one speaks of psychological skills in sports the inevitable question arises, “What are psychological skills in sport?” According to Murphy and Tammen (1998) psychological skills include the following: 1) creative thinking, 2) staying calm in pressure situations, 3) concentration, 4) goal attainment, 5) thought control, 6) emotional control, and 7) consistency. Reviewing the contents of a popular sport psychology text reveal that psychological skills involve awareness, goal setting, arousal regulation, imagery, self-talk, and concentration (Williams, 1998). Most comprehensive psychological skills training programs in sport settings stress the development of skills and techniques in anxiety management, imagery, goal setting, concentration, self-talk, and thought stopping Weinberg and Williams (1998).

Sufficient evidence exists to support the effectiveness of facilitating the use sport psychology skills. Much of the research examining the effectiveness of sport psychology as an intervention has involved its utility in enhancing athletic performance. Feltz and Landers (1983) performed a meta-analysis examining the effects of mental practice on motor skill learning and performance. Their research included 60 studies with the following criteria: 1) single group studies that used pre- and posttest scores and 2) multiple group studies with at least one

comparison between an intervention and control group. They found that these studies resulted in an average effect size of 0.48, which led these authors to conclude that the mental practice of a motor skill “influences performance somewhat better than no practice at all.” In another meta-analysis, this time on goal setting, Kylo and Landers (1995) reviewed 36 studies that met the following criteria: 1) studies that investigated the effects of goal setting on sport, exercise, or motor performance and 2) included a comparison group. They concluded that goal setting improves sport performance by 0.34 of a standard deviation and added that moderate, outcome oriented, and combined short- and long-term goals were associated with the largest effects. In a broader study that examined the effects of several psychological interventions with competitive athletes, Greenspan and Feltz (1989) analyzed 19 published studies, involving 23 types of interventions. These interventions were grouped into three categories: relaxation training, behavioral techniques, and cognitive restructuring procedures. The criteria used by these authors, to include studies in their meta-analysis, was the following: 1) participants in the studies were “athletes who competed on a regular and organized basis” and 2) design of the studies involved performance “in a noncontrived competition situation”, in the sport the athlete normally competed in. They concluded that overall, educational relaxation-based interventions and remedial cognitive restructuring interventions were the most effective interventions for improving the competitive performance of collegiate and adult athletes. Further support has been provided for educational relaxation-based interventions (Weinberg & Comar, 1994) and cognitive behavioral interventions (Whelan, Mahoney, & Myers, 1991) on their effectiveness to improve athletic performance.

Sport psychology interventions are also used in areas outside of athletic performance enhancement. Ievleva and Orlick (1993) believed that the following mental activities are

important in helping enhance athletic injury recovery: commitment, seeing the opportunities, goal setting, attitude and belief, positive self-talk, relaxation, mental imagery, and coping with fear of reinjury. The use of psychological skills in sport settings also involves a number of different populations. Sport psychology has been used with youth, college student-athletes, Olympic athletes, professional athletes, and recreational athletes; elderly populations and physically challenged individuals (Weinberg & Gould, 1995). It will soon be evident that psychological skills training has often been used to assist injured athletes with rehabilitation as well.

Use of psychological skills to facilitate athletic injury rehabilitation. It has been suggested that timing and specific techniques for treating psychological aspects of sport injury has not been adequately addressed (Wagman & Khelifa, 1996). Therefore, Wagman and Khelifa (1996) outlined specific guidelines to follow when assessing and counseling athletes following athletic injuries. They suggested that by following their prescribed guidelines an athletic trainer can: (1) establish trust and rapport, (2) become familiar with an athlete's perception of injury, and (3) attempt to get an athlete to commit to treatment. The authors provided a ten-item patient assessment list to help the athletic trainer determine whether psychological intervention is necessary. Finally, the authors offered precise counseling guidelines to address psychological issues for a qualified sport psychologist to follow. In two of the six steps they provided, teaching general psychological skills and providing social and emotional support are included. The psychological skills they reviewed include: cognitive restructuring, RET, systematic desensitization, panic mitigation, coping rehearsal, career adjustment techniques, confidence training, positive self-talk, thought stoppage, relaxation skills, imagery, motivation, and concentration skills (Wagman & Khelifa, 1996). They are not alone in their belief that

psychological skills and social support are important factors in rehabilitation (Brewer, Jeffers, Petitpas, & Van Raalte, 1994; Johnson, 1997; Wiese, Weiss, & Yukelson, 1991).

In an extensive survey, Wiese, Weiss, and Yukelson (1991) assessed the attitudes and beliefs of athletic trainers regarding the use of psychological strategies to injury rehabilitation. Of the 115 (49 males, 66 females) athletic training professionals they surveyed, about a third had master's degrees, a third had bachelor's degrees, and the remaining third had high school diplomas. Almost half of the sample were certified athletic trainers, while the rest were students preparing for trainer certification. Participants responded to a Likert rating scale on athlete characteristics, efficacy of psychological strategies, and perceived importance of trainer knowledge about psychological strategies. A five-point Likert rating scale was used. Descriptive statistics were compiled from the responses of "not at all important" to "very important." Descriptive statistics were used for all the responses. Results revealed that athletic trainers believe many psychological skills and strategies are important to an injury rehabilitation program. For example, focusing on short-term goals, encouragement of positive self-thoughts, relaxation techniques, visualization were rated as effective techniques for athletes going through injury rehabilitation. Communication, motivation, and social support were identified as key psychosocial contributors to successful rehabilitation as well (Wiese et al., 1991). A shortcoming of this study is that it relied on the perceptions of athletic trainers in exploring what psychological strategies are important to the rehabilitation of injured athletes. This is not to suggest that this population's opinions are of no value. However, studies that examine measurable relationships and effects between psychological strategies, social support, and athletic injury rehabilitation among injured athletes are more valid in nature. Given the study's limitations it still provides support and impetus to encourage this type of empirical research.

In another study, two experiments were conducted to assess perceptions of three different psychological interventions in the process of athletic injury rehabilitation (Brewer, Jeffers, Petitpas, & Van Raalte, 1994). In experiment 1, 161 college students rated their perceptions of goal setting, imagery, or counseling as an additional intervention to physical therapy for a hypothetical injured athlete. In experiment 2, 20 injured athletes were given brief introductory sessions of goal setting, imagery, and counseling. After each intervention, participants' perceptions were assessed. In both experiments, participants preferred the use of goal setting over imagery and counseling. However, positive perceptions were made for all three interventions. A number of limitations were found in this study. In experiment 1, the methods section involved the surveying of perceptions of the use of three possible psychological interventions for a hypothetically injured athlete. It is unknown how an injured athlete would respond to actual exposure and facilitation of the psychological interventions proposed in this study. In experiment 2, participants were patients at a sports medicine clinic and, as volunteers, may not accurately represent injured athletes or even sports medicine patients. Also, even though participants in this experiment were provided actual psychological interventions, it was limited to just one session for each intervention. Most interventions are provided as part of an overall treatment program and over time, thus it is difficult to suggest that the findings in this experiment could generalize over a longer period of time. Although, there are a number of limitations in this study, it is important to note that it was designed to be an exploratory endeavor. The results seem to provide sufficient support to encourage further research to empirically examine the impact goal setting, imagery, and counseling can have on the rehabilitation of injured athletes.

A recent longitudinal study, involving injured, competitive athletes, provides further support for the positive relationship between sport psychology skills, social support, and athletic injury rehabilitation. Johnson (1997) followed the rehabilitation of 77 competitive athletes with traumatic and severe injuries for two to three years from the time of injury. The purpose was to identify potential risk factors in rehabilitation. The findings revealed that being younger, being female, and having had no previous experience with injury characterized athletes that failed to return to competitive sports. Results also suggested that having an insufficient mental plan for rehabilitation, having a negative attitude toward rehabilitation, having a low mood level, and having restricted social contacts with fellow athletes appeared to be associated with a prolonged and difficult rehabilitation. Although the study involved a relatively large pool of participants, the results that made up a significant portion of the discussion section involved comparisons between a “non-returning” group and a “returning” group. The non-returning group was made up of only seven participants who were classified as being physically fit at the end of rehabilitation and cleared to practice and compete by a physiotherapist, but did not return to active participation 15 months after injury. The returning group was composed of only five participants and were classified by the treating physiotherapist as not being fully rehabilitated at the end of rehabilitation, but were actively participating 15 months post injury. Although statistical significance was reported by the primary researcher to draw support for conclusions, it would be unwise to generalize further than the 12 participants that made up much of the study’s findings. However, the study does suggest the positive impact psychological strategies and social support can have on injury rehabilitation.

An investigation of the effects of stress inoculation training on athletes’ postsurgical subjective pain, anxiety, and physical functioning was performed (Ross & Berger, 1996). The

participants were 60 Caucasian, male athletes who competed at least weekly in a competitive team or individual sport. Participants were alternately assigned to either a treatment group (physical rehabilitation and stress inoculation) or a control group (physical rehabilitation alone). The athletes suffered knee injuries that required surgical treatment and at least three weeks of postsurgical rehabilitation. Measures were taken at ten different times. The State-Trait Anxiety Inventory (STAI; Spielberger, Gorsuch, & Lushene, 1970) was used to identify both state and situational anxiety. To measure the subjective experience of pain the Visual Analogue Scale (VAS) (Keefe, Brown, Scott, & Ziesat, 1982) was used. Participants were instructed to indicate their current level of pain intensity. A device called the Cybex II Isokinetic Dynamometer was used to measure knee strength in order to determine whether participants had returned to physical functioning. The authors determined physical functioning to be injured knee strength at 80% of non-injured knee strength for two consecutive measurement sessions. Participants in the treatment group were provided two 1-hour stress-inoculation-training sessions based on procedures by Wells, Howard, Nowlin, and Vargas (1986). No significant differences were found on age, state and trait anxiety scores, or pain during the pretreatment stage, which indicated the groups were similar before the experiment. Post-treatment phase, both state anxiety and pain decreased over time more rapidly for participants in the treatment condition than those in the control condition. Participants in the treatment group reported significantly less pain from Time 2 to Time 10. They also recovered in significantly fewer days (23 days vs. 29 days). The facilitation of a psychological intervention such as stress inoculation training seemed to have had a positive impact on injured participants' perception of anxiety and pain and their recovery time. Psychological interventions have been found to be positively related to athletic injury rehabilitation in other studies as well.

Ievleva and Orlick (1991) performed an exploratory study to determine whether athletes who healed very rapidly demonstrated greater evidence, than did slower healing athletes, of psychosocial factors thought to be related to enhanced healing. More specifically, they tried to determine whether there was a relationship between recovery time from ankle and knee injuries to the following psychological factors: attitude, outlook, level of stress, social support, self-talk, goal setting, and mental imagery. Participants included former patients from a sports medicine clinic who suffered grade II knee injuries or ankle injuries. They also met the following criteria: 1) have recovered; 2) been minimally active before their injury and must have returned to their previous activity level; and 3) have undergone physiotherapy. Thirty-nine individuals who met the criteria were sent surveys. Of the 39 eligible participants, 32 returned surveys. Participants were asked to rate the importance of each psychological factor on a scale from 0 to 10. Pearson product moment correlations and t-tests were computed to determine relationships between recovery time and psychological factors, and differences between fast and slow healers on the psychological factors, respectively. Fast healers were defined as those who recovered in five weeks or less. Slow healers were defined as those who recovered after over 12 weeks. Goal setting, positive self-talk, and healing imagery were ranked as the top three psychological factors in successful rehabilitation because they were more significantly related to recovery time than the other psychological factors. There was also a significant difference between fast and slow healers on these three factors. Fortunately, these factors involved skills that can be taught and are more within a person's control, which is encouraging to those who work with injured athletes.

Stress management is another psychological intervention found to be related to improved rates of injury in college athletes (Davis, 1991). Davis investigated the injury rates of a NCAA Division II varsity swim team and a Division I-A football before, during, and after stress

management interventions, which involved progressive relaxation techniques. This intervention was provided after each weekday practice for the swim team for an entire season and just two sessions per week for the football team for a season. Injury data were obtained from the university's athletic training program. For the swim team, in the year before the stress management program, 52 injuries were treated. During the intervention year, only 24 injuries were reported (52% reduction). The author was unable to determine the injury rates one year after the intervention program began due to coaching changes and changes in injury reporting protocols. For the football team, in the year before the stress management program was implemented, 18 severe injuries were reported. In the next two years, with intervention, the severe injury rate declined to 12 and 13, respectively. Thus, it appears as if the stress management program may have influenced the rate of reported injuries (Davis, 1991). However, as noted by the author, the teams used in this study began having winning seasons during the implementation of the stress management program. Also, stress management can be used as a form of pain management. The results may be explained by the notion that athletes may ignore or be less aware of injuries when they are experiencing success or athletes may be better able to cope with or mask the negative effects of an injury with a greater ability to cope with pain. Clearly, more research is needed to understand the actual impact stress management can have on athletes' and team's rate of injury.

Although, the research on the effectiveness of psychological skills training on sport injury rehabilitation is limited and unclear, there have been attempts to expand on previous studies. For example, Green (1992) provided a review of the literature supporting a mind-body paradigm for rehabilitation from both a psychophysiological and psychomotor viewpoint. Green (1992) also discussed the application of imagery techniques for athletic injury rehabilitation

depending on the point of time of the injury. For example, different techniques or behaviors are used or exhibited before the injury, immediately following the injury, and during the rehabilitation program leading to the athlete's recovery. It is possible that not only can psychological skills training have an affect on injury rehabilitation, but it may also affect adherence to injury rehabilitation.

Athletic Injury and Adherence to Rehabilitation

A number of factors can affect athletes' commitment to adhere to rehabilitation of their injuries. A study was done that examined the influence of self-motivation and demographic variables (gender, academic classification, sport, season of competition, scholarship status, and nature of injury) on injured athletes' adherence to rehabilitation (Culpepper, Masters, & Wittig, 1996). Self-motivation, defined as being reinforced by one's own ideas, goals, and behaviors versus situational factors and other people, was measured with the Self-Motivation Inventory (Dishman & Ickes, 1981). Type of injury was categorized as either acute (e.g., sprains, dislocations, fractures, and contusions) or stress (e.g., stress fractures, back pain, shin splints, sprains, and tendonitis). Severity of injury was classified as either minor (absent from practice or competition for less than one week, moderate (absent from practice or competition for more than one week but less than one month), or major (absent from practice for more than one month). Adherence to rehabilitation was measured in four ways: 1) attendance, 2) trainer judgment, 3) ranking of all participants' adherence, and 4) combined score of first three measures to create overall score of adherence. Twenty-five (17 male, 8 female) injured college athletes from several sports (football, gymnastics, diving, swimming, volleyball, cross country/track, baseball, and tennis) participated. Results indicated that those athletes who exhibited high levels of adherence shared the following characteristics: high self-motivation, upper-class academic status,

scholarship athlete, and minor or moderate injury. This is problematic in that a sport psychology professional or helping professional can possibly exert some control over only one of these variables, self-motivation. This suggests that a helping professional can be most helpful by assisting injured athletes in owning or taking responsibility for the provision of social support and internalizing psychological strategies they believe will have an impact on their recovery.

Duda, Smart, and Tappe (1989) completed a similar study with 40 male and female college athletes from a variety of sports. All participants had suffered a sport related injury of at least second-degree severity (most to knee, ankle, and shoulder). Adherence to injury rehabilitation was defined as a combination of attendance at prescribed sessions, degree of completion of the prescribed exercise protocol, and the injured athlete's intensity or effort exerted in performing the prescribed exercise. Injured student-athlete participants were asked to complete a battery of assessments measuring a variety of variables that fell under the following three components: 1) Personal incentives (i.e., task involvement, ego involvement, power, recognition, and affiliation; 2) Sense-of-Self Beliefs (i.e., perceived physical ability, sport confidence, locus of control, goal directedness, and social support); 3) Perceived Options (i.e., perception of rehabilitation experience to be a viable option in terms of recovery; perception of athletic involvement to be a viable option subsequent to their injury rehabilitation). Athletic trainers working with injured athlete participants were asked to evaluate athletes' adherence to rehabilitation. Results indicated that athletes who showed greater adherence to rehabilitation believed in the efficacy of the treatment provided by the athletic training staff, perceived more social support for their rehabilitation, were more goal directed or self-motivated, and placed more emphasis on mastery or task-involved goals in sport.

Brewer (2001) adheres to Wiese-Bjornstal et al. (1998) integrated, cognitive appraisal model described previously to suggest many factors that can affect adherence to sport injury rehabilitation. According to Brewer (2001), personal factors, situational factors, cognitive responses, and emotional responses should be associated with adherence. Personal factors he cites that are positively correlated to adherence include: internal health locus of control, pain tolerance, self-motivation, task involvement, and tough-mindedness.

Situational factors positively correlated to adherence cited by Brewer (2001) include: academic class status, academic performance, belief in the efficacy of the treatment, comfort of the clinical environment, convenience of rehabilitation scheduling, degree of career goal definition, importance or value of rehabilitation, injury duration, perceived academic load, perceived amount of sport participation time, perceived availability of time for rehabilitation activities, perceived injury severity, perceived susceptibility to further complications without rehabilitation, plans for post collegiate sport participation, rehabilitation practitioner expectancy of patient adherence, and social support for rehabilitation (Brewer, 2001).

Cognitive responses positively related to adherence to rehabilitation include: high ability to cope with injury, high rehabilitation self-efficacy, high self-esteem certainty, attribution of recovery to stable and personally controllable factors, setting of rehabilitation goals, use of imagery, and use of positive self-talk (Brewer, 2001). Little research has been done examining the relationship between emotional responses and adherence to sport injury rehabilitation. However, Brewer (2001) cited studies that have suggested mood disturbed is inversely related to athletic injury rehabilitation adherence.

Summary

The prevalence of injury in sports is high (Heil, 1993a). For college student-athletes the pressure to ignore their injuries and related physical problems is high as well (Tunick et al., 1996). Intense pressure or stress related to injury is one of many factors that impact rehabilitation of athletic injuries and adherence to that rehabilitation. Two factors that may have a positive impact on adherence to rehabilitation and thus, rehabilitation outcome are social support and sport psychology skills or strategies. Support has been found to strongly suggest that both of these factors can and do positively impact rehabilitation outcome and adherence. However, it is not as well established exactly what types of social support and what kinds of sport psychology skills effect adherence to rehabilitation in a positive manner. The purpose of the current study is to find evidence that provides support in determining the types of social support and sport psychology skills that have the most impact on adherence to athletic injury rehabilitation.

Chapter Three

Methodology

This chapter will describe the procedures used to conduct this study, its design, and the methods that were used to analyze the data gathered in this study. A description of the participants recruited for this study and the methods used for data collection will be provided. A review of the measures that were used in this study will be followed by a description of the plan used to gather the data. Lastly, the design and statistical analyses used for this study will be described.

Participants

Participants were recruited from one NCAA Division I and three NCAA Division II universities. The Division I institution was a medium to large Midwestern university with a student population of over 22,000. The Division II schools were all from the Mid Atlantic region. Student population varied from 1,600 to 5,900 students. Participants were included in this study if they had sustained an athletic injury during practice or competition that caused them to visit their respective athletic training facilities and work with an athletic trainer for at least two weeks or at least ten sessions (not necessarily consecutive).

A total of 35 (male = 16, female = 19) injured student athletes participated in this study. The average age of participants was 19.6 years (S.D. = 1.09). Six participants failed to complete the Social Support Behavior Survey-Clinical Form (SSS-C) and the Check List Concerning Use of Sport Psychology Strategies. A balanced number of participants came from both Division I and II programs (Division I = 18, Division II = 17), were primarily represented by Caucasian and African American student-athletes, and represented a variety of sports. A more detailed description of the participants is provided in Table 1. Because criterion of participant inclusion

*Table 1.**Overall Demographics Summary*

Characteristic	Sample Size	Percentage
<u>Group</u>		
Low SIRAS	17	48.6
High SIRAS	18	51.4
<u>Ethnicity</u>		
Black/African American	7	20.0
Asian American	1	2.9
White/Caucasian	27	77.1
<u>Gender</u>		
Male	16	45.7
Female	19	54.3
<u>Sport</u>		
Football	14	40.0
Rowing (women's)	6	17.2
Track & Field (men's)	1	2.9
Baseball	2	5.7
Volleyball (women's)	3	8.6
Soccer (women's)	2	5.7
Softball	2	5.7
Swimming (women's)	2	5.7
Tennis (women's)	1	2.9
<u>NCAA Division</u>		
Division I	18	51.4
Division II	17	48.6
<u>Injury Severity (according to participant)</u>		
Mild	12	34.3
Moderate	15	42.9
Severe	8	22.9

was broad the type of injuries sustained in either athletic practice or competition by this study's participants varied greatly. Examples of injuries included ankle sprains, lower back pulls, tendonitis, foot fractures, and knee ligament tears. Athletic trainers classified the injuries sustained by participants in this study as being mild ($n = 8$), moderate ($n = 15$), or severe ($n = 12$); which means that about 77% of the participants sustained moderate to severe athletic injuries. Participants attended an average of 42 sessions.

Data from two participants was excluded from analysis because they failed to complete the surveys and only provided demographic information. Data was gathered by means of a web-based survey system. (See Appendix F for a copy of the web-based battery of surveys).

Instruments

Participants were asked to complete a battery of forms that included a demographics section and three assessments. These forms were formatted and placed on a web-based survey system so participants could, more conveniently, complete the battery of forms in the athletic training areas where computers with internet access were available (See Appendix F) or at the convenience of their home or school computer lab. The web-based survey included a Consent and Information Sheet explaining the purpose of the study and their rights as a voluntary participant (See Appendix G). The use of sport psychology strategies in competition and practice before participants' injury was assessed with the TOPS (Thomas, et al., 1999) (See Appendix D) while participants' access to a variety of social support systems was assessed with the SSS-C (Richman, et al., 1993) (See Appendix C). Adherence to athletic injury rehabilitation was measured with the SIRAS (Brewer, et al., 1995) (See Appendix B). The demographics section was used to gather information on participants' age, gender, class status, sport, race/ethnicity, type of injury, severity of injury, and date of injury (See Appendix A). Descriptive statistics were

provided for each of these demographic variables. Differences in proportions for male and female participants was examined to see if differences existed in use of sport psychology strategies in competition, rehabilitation, and experience of formal training. Differences in proportions were also tested for the same issues with participants' class status and level of injury severity (according to athletic trainer) used as independent variables. Following is a description of each measure provided in the battery of assessments.

Test of Performance Strategies. The purpose of developing the TOPS (Thomas, Murphy, & Hardy, 1999) was to assess psychological skills for both individual assessment purposes and to monitor the effects of psychological skills training programs upon skill development. In addition to using this measure in a sport performance context, it is also used to assess psychological skills in practice.

Initially a pool of 112 items was constructed by the authors to measure athletes' skills and strategies in each of eight areas that were deemed the most salient psychological skills and techniques used by athletes. These constructs included: attentional control, goal-setting, imagery, relaxation and activation, self-talk, emotional control, and automaticity. After consulting with athletes and sport psychologists, Thomas and his colleagues (1999) made further "modifications, additions, and deletions" to the instrument, which were not detailed in their article. The remaining items were given to a group of 10 applied sport psychology consultants. This led to further modifications and an inventory that had 111 items to be used in a preliminary investigation.

Further validation tests were performed. The 111 items were divided into two scales. Fifty-six items were placed in the competition scale and 55 items were placed in the practice scale. Principal axis factor analyses yielded 32 items in each scale to be further analyzed. Factor

analyses resulted in eight factors with eigenvalues greater than 1.0 accounting for at least 60.4% of the variance in each scale. Factors for competition strategy included: self-talk, emotional control, automaticity, goal-setting, imagery, activation, negative thinking, and relaxation. The internal consistency on competition subscales ranged from .74 to .80 with a mean of .78. Factors for practice strategy included all of the factors in competition strategy but negative thinking. It had attentional control as an eighth factor. The internal consistency on practice subscales ranged from .66 to .81 with a mean of .73 (Thomas et al., 1999). Each factor in each strategy scale had four items to measure a specific construct.

Discriminant validity was found to differentiate gender, age, and ability for both strategies. In general, older performers (17–19 years old and 20 years of age or older) were found to use imagery and activation more than their younger counterparts (17 years old or younger). Males were found to use automaticity more, but imagery less than their female counterparts. A detailed description of further differentiation by performance standard (e.g., other, recreational, junior national, college and regional, national, international) is provided (Thomas et al., 1999) and broken down by gender for both competition and practice subscales. Findings suggest that overall, for both male and female participants, international athletes used the psychological strategies more often (except for negative thinking, which was lower) in practice and competition than their counterparts who competed at lower levels. Due to the preliminary nature of this newly developed measure, tests of validity and reliability are greatly limited at this time. Because of this, only the goal setting, self-talk, relaxation, and imagery factors under the competition subscale will be used for this study. A review of the literature provides sufficient support for the benefits of these sport psychology skills with injury rehabilitation (Ieveleva & Orlick, 1991; Ross & Berger, 1996; Crossman, 1997; Shaffer & Wiese-Bjornstal, 1999; Scherzer et al., 2001).

Social Support Behavior Survey-Clinical Form (SSS-C). Types of social support available to participants will be measured using the SSS-C. This instrument is used to gather five areas of information for eight forms of social support: 1) the initials and relationships for each person who provides the support (provides two pieces of information, the number of support providers and the composition of the participants' social support network); 2) satisfaction with the support received; 3) how difficult it would be to obtain more of the support; 4) the perceived importance of the support for the participants' well-being (Richman et al., 1993). The eight forms of social support listed by Richman et al. (1993) include: 1) listening support, 2) emotional support, 3) emotional challenge support, 4) reality confirmation support, 5) task appreciation support, 6) task challenge support, 7) tangible assistance support, and 8) personal assistance support.

Structural validity of the SSS-C was explored to examine the fit of the eight types of social support with the four questions used in each type. This was done by analyzing the 12 correlation matrices involved, eight for the content factors (types of social support) and four appraisal factors (four questions used in each type). Support was found to suggest that the four questions posed for each type of social support measure independent aspects of each form of support. Also, support was found to show that the eight social support types were related but two distinct forms of support. It has been suggested that the four questions may indeed represent independent factors (Rees, Hardy, Ingledew, & Evans, 2000). However, it has also been argued that the analyses used by Richman et al. (1993) were inadequate to test the independence of the eight types of social support factors and that conclusions to suggest otherwise lack empirical support (Rees et al., 2000).

Concurrent validity between the SSBS-C and other measures of social support was examined. Significant positive correlations were found between three of the four SSS-C

emotional support variables and the Norbeck Social Support Questionnaire (NSSQ; Norbeck, Lindsey, & Carrieri, 1983) affect variable: .63 ($p < .01$) for number of providers, .52 ($p < .05$) for satisfaction, and .70 ($p < .001$) for difficulty obtaining more. Significant correlations were found between three out of eight SSS-C tangible assistance and personal assistance variables and the NSSQ's aid variable: .54 ($p < .05$) for number of providers of tangible assistance and .68 ($p < .01$) and .61 ($p < .01$) for number of providers and satisfaction, respectively for personal assistance. No significant correlations were found between the SSS-C reality confirmation support variables and the NSSQ's affirmation variable. Scores of the SSS-C were also compared to scores on the Marlowe-Crowne Measure of Social Desirability (Strahan & Gerbasi, 1972) and the SSS-C was determined to be free of social desirability bias (Richman et al, 1993).

Test-retest reliability of the SSS-C was also examined (Richman et al, 1993). Participants ($n = 27$) completed the measure twice; one group of 16 participants completed it again after two weeks, while a second group of nine completed again after five weeks. All but four of the 32 items (four questions for each of the eight social support types) were significantly correlated. Significant correlations ranged from .44 ($p < .01$) to a high of .87 ($p < .001$). The average significant correlation was .60. The attempt by Richman et al. (1993) to test-retest the SSS-C with an item-by item analyses was noted as a limitation by the authors because of its inherent nature to deflate correlation coefficients. The authors did not present an explanation why they did not test-retest overall SSS-C scores or even subtest scores of the SSS-C. However, they suggested the results were encouraging given the low sample size and tendency for measures of social support to have low test-retest reliability.

A slightly modified version of the SSS-C will be used for this study. Participants will be asked to consider how they would respond to the items in the SSS-C when they were undergoing

rehabilitation. In the instructions for the SSS-C, the following was added in parentheses:

“Remember, these questions are based on how you felt during rehabilitation.” This was done to help participants maintain their focus on what type of social support they received while injured and undergoing rehabilitation. This was the only modification made to this survey. According to Robbins & Rosenfeld (2001), the SSS-C has a history of being adapted to meet the needs of researchers and working well in its modified forms, maintaining acceptable content, structural, concurrent, and construct validity.

Sport Injury Rehabilitation Adherence Scale (SIRAS). Injury rehabilitation will be assessed by observing participants' degree of adherence to rehabilitation. This will be done with the SIRAS (Brewer, Van Raalte, Petitpas, Sklar, & Ditmar (1995). This is a three-item measure in which practitioners, such as physical therapists or athletic trainers, rate on 5-point Likert scales, the patients' intensity of completion of rehabilitation exercises, the frequency with which they follow the practitioner's instructions and advice, and their receptivity to changes in the physical therapy program during that day's visit. The Likert scales for the three items range from minimum effort to maximum effort, never to always, and very unreceptive to very receptive, respectively. The SIRAS appears to be psychometrically sound. Brewer, Van Raalte, Petitpas, et al. (2000) reported a Cronbach's alpha coefficient of 0.82 for the SIRAS and they found that a principal components analysis revealed a single factor accounting for 74% of the variance. This suggests the items on this measure can be totaled to create a single score representing adherence to athletic injury rehabilitation. Scores on the SIRAS were found to be weakly correlated ($r = .21, p < .05$) with attendance at rehabilitation sessions, which provides support for discriminate validity. A test-retest was performed and a reliability coefficient was computed to 0.77 over a one-week period. Interrater reliability between a primary provider and a secondary provider of

rehabilitation treatment was also tested which resulted in an intraclass correlation of 0.57. This suggests that different providers or athletic trainers will use the SIRAS in a similar fashion (Brewer, Van Raalte, Petitpas, et al., 2000).

Check List Concerning Use of Sport Psychology Strategies. Three close-ended questions, requiring yes or no responses were asked that explored participants' use of sport psychology skills in competition and rehabilitation and whether or not they have been formally trained in the use of sport psychology skills (See Appendix E). This checklist was developed by the primary researcher and his chair in order to provide an additional means of examining participants' use of sport psychology skills.

Procedures

Participants were recruited through the athletic department's training room staff at the four institutions used for this study in one of two ways. Different means were used because the athletic trainers, assisting the primary researcher, had different opinions about the best and most convenient means of gathering data with their student-athletes. The first means of data gathering was done at the lone Division I university during the summer of 2002. Here, the staff was asked to identify student-athletes who sustained injuries during the previous or current semester data was being gathered for this study. These participants were student-athletes who had sustained an athletic injury (ies) that caused them to attend rehabilitation at the athletic training centers for at least two weeks or ten sessions (not necessarily consecutive). Participants who attended rehabilitation for over two weeks or for more than ten sessions were also included. Previous studies have varied with concern to time span of rehabilitation when examining adherence. For example, time span of rehabilitation used as a criteria for study inclusion, has ranged from at least three rehabilitation sessions (Brewer et al., 2000), to an average of three weeks of missed

practices and scheduled rehabilitation sessions (Duda et al., 1989), to four weeks post knee surgery (Laubach, Brewer, Van Raalte, & Petitpas, 1996) to 4.8 months after ACL surgery (Pizzari, McBurney, Taylor, & Feller, 2002). It was decided that a criteria of two weeks or ten rehabilitation sessions would be sufficient to examine adherence in this study and it was also believed that this criteria would help in gathering an adequate sized sample.

From the time the study began, during the first gathering of data, all injured athletes who reported to the training room for treatment and who fit the study's criteria were asked to participate in the study by their athletic trainer after they had been evaluated and treated. Upon participants' agreement to partake, they were directed to a computer in the athletic training room that was connected to the internet and asked to complete the battery of surveys included in this study. Completion of the on-line survey (See Appendix F) signified participants' willing consent to participate in this study. Participants were asked to provide identifying information on the on-line survey so that information could be gathered about their adherence to rehabilitation, via their athletic trainer. This identifying information was the participant's initials and social security number. Once adherence to rehabilitation information on a participant was acquired, their identifying information was destroyed and their data would then be associated with a code number. They were informed and assured that the personal information they provided would be kept confidential and not shared with their trainers or anyone beyond the primary investigator. The athletic trainer, who has worked primarily with an athlete/participant, was asked to complete the SIRAS to assess participants' adherence to athletic injury rehabilitation.

During this first means of data gathering, the head athletic trainer reported that 25 student-athletes were asked to complete the on-line surveys. Twenty of these participants were

reported to have agreed to participate in this study. However, upon closer inspection, not all of these participants completed the entire battery of surveys.

The second means of data gathering was conducted during the spring of 2003 and was similar to the first means. However, the athletic trainers at the Division II institutions asked that the student-athletes be allowed to complete the battery of on-line surveys at home or at a school computer lab. This was asked because some of these schools did not have a computer accessible to students or they did not want student-athletes participating in the study on their on-site computers while athletic training services were being conducted. Given these conditions, the athletic trainers were asked to provide a list of student-athletes meeting the criteria of this study. The athletic trainers also provided potential participants' email addresses (with student-athletes' prior permission) so that the primary researcher could contact them and ask them to participate in this study. This resulted in a list of 44 potential participants. After making three email recruiting contacts/attempts, 17 of these student-athletes agreed to and completed the battery of surveys.

All procedures were conducted in accordance with the ethical standards of the American Psychological Association (APA) and the guidelines set forth by the Internal Review Boards of the universities and colleges included in this study (See Appendix H for IRB Letters of Approval).

Statistical Analyses

Descriptive data (i.e., age, gender, class status, race/ethnicity, sport, university, and type and severity of injury) related to the sample were gathered and are provided in Chapter Four. A copy of the demographics section can be found in Appendix A.

It is important to note that some of the participants did not fully complete the battery of surveys used for this study. Specifically, six of the 35 participants failed to complete the SSS-C

and the Check List Concerning Use of Sport Psychology Strategies. This led to different sample sizes being used for statistical analyses that involved sport psychology variables and social support variables.

In order to determine if sport psychology strategies and types of social support have an effect on adherence to athletic injury rehabilitation two MANOVAs were performed that used adherence to athletic injury rehabilitation as an independent variable (low and high) and scores on the Competition subscales of the TOPS (goal setting, imagery training, relaxation, self-talk) and SSS-C (listening support, emotional support, emotional challenge support, reality confirmation support, task appreciation support, and task challenge support) as dependent variables. A separate ANOVA that used the same independent variable, but total SSS-C score as the dependent variable was performed, because it could not be included in the MANOVA for social support scores. To do so, would have violated the assumption, for this statistical procedure, that dependent variables are independent of one another. Participants' scores on the SIRAS were divided into approximate halves, using a median split, to determine what their classification would be as an independent variable. Thus, participants were classified as either low or high adherers to injury rehabilitation. Individual ANOVAs were planned to be performed on each subscale if significant findings were found with the MANOVAs involving the dependent variables TOPS Competition subscale scores and SSS-C subscale scores with SIRAS level (low and high) being the independent variable.

In order to designate study participants as being either low or high in adherence to athletic injury rehabilitation (SIRAS) a median split was attempted. Because the distribution of SIRAS scores was negatively skewed, there being a greater frequency of high SIRAS scores, and the range of SIRAS scores was limited (minimum=5, maximum=15) an uneven split was created.

It was determined that scores between 1 and 12 ($n=17$, 48.6%) would be classified as “low” and that scores between 13 and 15 ($n=18$, 51.4%) would be classified as “high”.

Pearson correlation coefficients were computed between scores on the SIRAS and scores on the TOPS subscales (goal setting, imagery training, relaxation, and self-talk). Pearson correlation coefficients were also done between scores on the SIRAS and scores on the SSS-C subscales (listening support, emotional support, emotional challenge support, reality confirmation support, task appreciation support, and task challenge support) and the SSS-C total score.

Three close-ended questions, requiring yes or no responses were asked that explored participants’ use of sport psychology skills in competition and rehabilitation and whether or not they had been formally trained in the use of sport psychology skills (See Appendix E). The sport psychology skills to be included were: Negative Thinking, Attentional Control, Goal Setting, Imagery Training, Relaxation, Activation, Self-Talk, Emotional Control, and Automaticity. Differences in proportions for the sample were analyzed to explore participants’ use or nonuse of sport psychology skills in competition, during rehabilitation, formal training in these skills, and to see if proportions were effected by variables such as adherence level, gender, class standing, and severity of injury. Based on these questions, 99 chi-square analyses were performed to investigate the following:

- 1) The proportion of participants who report to either using or not using sport psychology strategies during either competition or rehabilitation.
- 2) The proportion of participants who report to either using or not using sport psychology strategies with participants who have either received or not received formal training in sport

psychology skills. This will be done for use of sport psychology strategies in competition and rehabilitation.

3) The proportion of participants who report to either using or not using sport psychology strategies with participants classified as either low or high adherers to athletic injury rehabilitation. This will be done for use of sport psychology strategies in competition and rehabilitation.

4) The proportion of participants who report to either using or not using sport psychology strategies with participants who are either male or female. This will be done for use of sport psychology strategies in competition and rehabilitation.

5) The proportion of participants who report to either using or not using sport psychology strategies with participants who are either labeled under-class or upper-class students. This will be done for use of sport psychology strategies in competition and rehabilitation.

6) The proportion of participants who report to either using or not using sport psychology strategies with participants who are described by athletic training staff as suffering from either a mild, moderate, or severe injury. This will be done for use of sport psychology strategies in competition and rehabilitation.

Yates' corrected chi-squares were performed for 2 x 2 tables that yielded cells that had an expected frequency of less than five.

Research Hypotheses

The following research hypotheses were tested within the context of this investigation:

- 1) Participant's Competition subscale scores (self-talk, goal-setting, imagery, and relaxation) on the TOPS will be different for varying levels of SIRAS scores (low and high).
- 2) Participant's subscale scores (listening support, emotional support, emotional challenge

support, reality confirmation support, task appreciation support, and task challenge support) on the SSS-C will be different for varying levels of SIRAS scores (low and high).

2a) Participant's total SSS-C score will be different for varying levels of SIRAS scores (low and high).

3) For TOPS Competition subscale scores, differences will be found on individual subscale scores by level of SIRAS scores (low and high).

4) For SSS-C subscales scores, differences will be found on individual subscale scores by level of SIRAS scores (low and high).

5) A positive correlation will exist between Competition subscale scores (self-talk, goal-setting, imagery, and relaxation) on the TOPS and scores on the SIRAS.

6) A positive correlation will exist between subscale scores and the total score on the SSS-C and scores on the SIRAS.

7) For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during competition will be the same whether the participants use this particular skill in either rehabilitation or competition.

8a) For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during competition will be the same for participants who have either received or not received formal training in this particular skill.

8b) For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during rehabilitation will be the same for participants who have either received or not received formal training in this particular skill.

9a) For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during competition will be the same among participants at low and high levels of adherence to rehabilitation.

9b) For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during rehabilitation will be the same among participants at low and high levels of adherence to rehabilitation.

10a) For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during competition will be the same among male and female participants.

10b) For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during rehabilitation will be the same among male and female participants.

11a) For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during competition will be the same among under-class (first and second year) students and upper-class (third and fourth year) students.

11b) For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during rehabilitation will be the same among under-class (first and second year) students and upper-class (third and fourth year) students.

12a) For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during competition will be the same among participants who have mild, moderate, or severe levels of injury according to athletic training staff.

12b) For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during rehabilitation will be the same among participants who have mild, moderate, or severe levels of injury according to athletic training staff.

Hypotheses 7a to 12b were tested for the following sport psychology strategies: Negative Thinking, Attentional Control, Goal Setting, Imagery Training, Relaxation, Activation, Self-Talk, Emotional Control, and Automaticity.

Summary

The hypotheses in this study anticipated that scores on selected measures of sport psychology strategies and social support would be different for varying levels of adherence to injury rehabilitation. A positive relationship between adherence to rehabilitation and sport psychology skills and social support was hypothesized. In addition, it was hypothesized that differences in proportions of the population sampled would be found in the use of sport psychology strategies in competition and rehabilitation and for those who have been formally trained in such skills. It is believed that the results of this study will assist in the design of treatment programs for injured athletes who could benefit from receiving social support and learning sport psychology skills.

Chapter 4

Results

Detailed results of this study will be reported in this chapter. The results will be systematically provided by following the order of the hypotheses described in the previous chapter. More specifically, the findings are reported in four main sections. The first section reports differences found between participants labeled low and high on adherence to injury rehabilitation on the following factors: specific sport psychology strategies and types of social support. The second section examines the relationships found between scores on adherence to injury rehabilitation and specific sport psychology strategies and types of social support. The third section reports participants' proportionately different uses of sport psychology strategies in competition and rehabilitation and participants' exposure to formal training in sport psychology. The final section includes additional analyses done to explore possible differences between participants at NCAA Division I and Division II institutions. These analyses involved the following dependent variables: TOPS Competition subscale scores for self-talk, goal setting, imagery, and relaxation; and scores on SSS-C types for listening support, emotional support, emotional challenge support, reality confirmation support, task appreciation support, and task challenge support. Tables have been included to illustrate the details of the results in the sections mentioned above. A brief summary is included that highlights some of the findings from this results chapter.

Two MANOVAs were computed to determine whether or not differences exist between low and high adherers to athletic injury rehabilitation on TOPS Competition subscale scores for self-talk, goal setting, imagery, and relaxation; and the following types of social support assessed by the SSS-C: Listening support, emotional support, emotional challenge support, reality

confirmation support, task appreciation support, and task challenge support. An ANOVA was computed to examine any differences between low and high adherers to athletic injury rehabilitation on the total SSS-C score.

MANOVA Set 1

Hypothesis #1 stated that a difference would exist between low and high scorers of the SIRAS on participants' scores on the following TOPS Competition subscales: Self-talk, goal setting, imagery, and relaxation. This was tested using a one-way MANOVA. No significant multivariate main effect for sport psychology strategies was found, $F(4, 30) = 1.60$, $p = .20$, $ES = .176$. A box test was conducted to test the assumption of homogeneity of the variance-covariance matrices, $F = .879$, $p = .553$. This non-significant result indicates that the variance-covariance matrices are equal. See Table 2 for means and standard deviations of the scores on these sport psychology strategies. Because of this finding hypothesis #3 was not tested.

MANOVA Set 2

Hypothesis #2 stated that a difference would exist between low and high scorers of the SIRAS on participants' scores on the following SSS-C social support types: Listening support, emotional support, emotional challenge support, reality confirmation support, task appreciation support, and task challenge support. This was tested using a one-way MANOVA. No significant multivariate main effect for social support types was found, $F(6, 22) = 1.28$, $p = .307$, $ES = .259$. A box test was conducted to test the assumption of homogeneity of the variance-covariance matrices, $F = 1.45$, $p = .084$. This non-significant result indicates that the variance-covariance matrices are equal. See Table 3 for means and standard deviations of the scores on these types of social support. Because of this finding, hypothesis #4 was not tested.

*Table 2.*Means and Standard Deviations of TOPS Competition Subscales *as a Function of SIRAS Level*

Factor	Group	Mean	Std. Deviation	N
Self-talk	Low	3.06	0.87	18
	High	3.60	0.80	17
	Total	3.32	0.87	35
Imagery	Low	3.25	0.92	18
	High	3.53	0.88	17
	Total	3.39	0.90	35
Goal-setting	Low	3.57	0.92	18
	High	4.16	0.85	17
	Total	3.86	0.92	35
Relaxation	Low	3.13	0.63	18
	High	3.43	0.61	17
	Total	3.27	0.63	35

Table 3.

Means and Standard Deviations of Social Support Types and Total Social Support as a Function of SIRAS Level

Factor	Group	Mean	Std. Deviation	N
Listening support	Low	18.33	5.99	15
	High	17.57	4.62	14
	Total	17.97	5.30	29
Emotional support	Low	18.40	4.94	15
	High	18.57	4.97	14
	Total	18.48	4.87	29
Emotional Challenge	Low	12.33	4.05	15
	High	13.71	5.05	14
	Total	13.00	4.53	29
Reality Confirmation	Low	13.47	2.75	15
	High	15.21	2.78	14
	Total	14.31	2.86	29
Task Appreciation	Low	15.47	4.17	15
	High	15.93	4.48	14
	Total	15.69	4.25	29
Task Challenge	Low	13.60	4.88	15
	High	15.64	4.16	14
	Total	14.59	4.59	29
Total Social Support	Low	117.73	25.94	15
	High	126.21	25.14	14
	Total	121.83	25.46	29

ANOVA. The possible difference between low and high scorers on the SIRAS on participant's total SSS-C score was tested using a one-way ANOVA. No significant difference was found, $F(1, 27) = .798, p = .380$. Test of homogeneity of variances was non-significant for total SSS-C scores. See Table 2 for mean and standard deviation of total SSS-C scores.

Correlation Matrices 1 and 2

For both hypotheses #5 and #6, it was stated that positive correlations would be found between scores on the selected TOPS Competition subscales (self-talk, goal setting, imagery, and relaxation) and scores on the SIRAS; and between scores on the selected SSS-C types (listening support, emotional support, emotional challenge support, reality confirmation support, task appreciation support, and task challenge support), total SSS-C score, and scores on the SIRAS. Pearson correlation coefficients were computed between all of these variables. Consistent, nonsignificant results were found between SIRAS scores and TOPS Competition subscale scores; and between SIRAS scores and all SSS-C types and total Social Support score. To see the values of the correlations between SIRAS scores and sport psychology strategies and between the SIRAS scores and types of social support, please refer to Tables 4 and 5.

Chi-Squares

Hypotheses 7 through 12b were developed to explore what sport psychology strategies participants used in competition and rehabilitation, whether or not they have received formal training in the use of these skills, and how the use and training of these skills differ due to level of SIRAS, gender, class status, and level of injury. These hypotheses were addressed by computing several chi-square analyses. Each of these hypotheses involved nine different sport psychology strategies (Negative Thinking, Attentional Control, Goal Setting, Imagery Training, Relaxation, Activation, Self-Talk, Emotional Control, and Automaticity). Thus, because there are

Table 4.

Intercorrelations Between Scores on the SIRAS and TOPS Competition Subscales

Scale/Subscale	1	2	3	4	5
1. SIRAS	—	.17	.22	.04	.17
2. Self-Talk		—	.73**	.78**	.64**
3. Goal-Setting			—	.76**	.67**
4. Imagery				—	.58**
5. Relaxation					—

* $p < .05$ ** $p < .01$

Table 5.

Intercorrelations Between Scores on the SIRAS and Social Support Types

Scale/Types	1	2	3	4	5	6	7	8
1. SIRAS	—	-.09	-.03	.15	-.07	.08	.25	.11
2. Listening Support		—	.31	.40*	.77**	.69**	.54**	.77**
3. Task Appreciation			—	.68**	.67**	.66**	.53**	.77**
4. Task Challenge				—	.55**	.65**	.53**	.77*
5. Emotional Support					—	.76**	.71**	.91**
6. Emotional Challenge						—	.69**	.91**
7. Reality Confirmation							—	.78**
8. Total Social Support								—

* $p < .05$ ** $p < .01$

11 hypotheses here, involving nine sport psychology strategies, a total of 99 chi-squares were computed. Given the magnitude of the number of analyses, a reporting of these results will be concise and consistent throughout this segment. Also, address inflated error rate due to multitude of chi-square analyses, significance value of $p < .0055$ will be used because nine analyses will be done for each of the hypotheses ($.05/9=.0055$). Yates' corrected chi-squares were performed for 2 x 2 tables that yielded cells that had an expected frequency of less than five. This allowed more conservative analyses to be done for these tables.

Hypothesis 7

For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during competition will be the same whether the participants use this particular skill in either rehabilitation or competition.

Negative Thinking (NT). No significant relationship was found between use of NT for competition and during rehabilitation. ($X^2 (1, N = 28) = 7.248, p = .007$).

Attentional Control (AC). A significant relationship exists between use of AC for competition and during rehabilitation. Participants were more likely to have used AC for competition and during rehabilitation than participants who used AC in only one of these settings ($X^2 (1, N = 28) = 12.66, p < .001$).

Goal Setting (GS). A chi-square was unable to be computed because it was found that all participants used goal setting for competition, while 26 out of 28 (93%) participants used goal setting during rehabilitation.

Imagery Training (IT). A significant relationship exists between use of IT for competition and during rehabilitation. Participants were more likely to have used IT for competition and

during rehabilitation than participants who used IT in only one of these settings ($X^2 (1, N = 28) = 10.16, p < .005$).

Relaxation (RX). A significant relationship exists between use of RX for competition and during rehabilitation. Participants were more likely to have used RX for competition and during rehabilitation than participants who used RX in only one of these settings ($X^2 (1, N = 28) = 11.63, p < .005$).

Activation (AV). No significant relationship was found between use of AV for competition and during rehabilitation. ($X^2 (1, N = 26) = 3.60, p = .058$).

Self-Talk (ST). A significant relationship exists between use of ST for competition and during rehabilitation. Participants were more likely to have used ST for competition and during rehabilitation than participants who used ST in only one of these settings ($X^2 (1, N = 28) = 14.42, p < .001$), (Yates' correction ($1, N = 28$) = 11.23 $p = .001$).

Emotional Control (EC). A significant relationship exists between use of EC for competition and during rehabilitation. Participants were more likely to have used EC for competition and during rehabilitation than participants who used EC in only one of these settings ($X^2 (1, N = 28) = 11.23, p < .005$).

Automaticity (AU). No significant relationship was found between the use of AU for competition and during rehabilitation. ($X^2 (1, N = 26) = 7.18, p = .007$).

Hypothesis (8a)

For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during competition will be the same for participants who have either received or not received formal training in this particular skill.

Negative Thinking. No significant relationship was found between use of NT for competition and receiving formal training in NT. ($X^2 (1, N = 28) = 4.55, p = .033$), (Yates' correction ($1, N = 28$) = 1.81, $p = .178$).

Attentional Control. No significant relationship was found between use of AC for competition and receiving formal training in AC. ($X^2 (1, N = 28) = 7.37, p = .007$), (Yates' correction ($1, N = 28$) = 5.25, $p = .022$).

Goal Setting. A chi-square was unable to be computed because it was found that all participants used goal setting for competition, while 22 out of 28 (79%) participants used goal setting during rehabilitation.

Imagery Training. No significant relationship was found between use of IT for competition and receiving formal training in IT. ($X^2 (1, N = 28) = 8.44, p = .004$), (Yates' correction ($1, N = 28$) = 5.25, $p = .022$).

Relaxation. A significant relationship exists between the use of RX for competition and receiving formal training in RX. Participants were more likely to have used RX for competition and received formal training in it than participants who experienced RX in only one of these conditions ($1, N = 28$) = 9.07 = .003.

Activation. No significant relationship was found between use of AV for competition and receiving formal training in AV. ($X^2 (1, N = 26) = 5.185, p = .023$), (Yates' correction ($1, N = 26$) = 3.32, $p = .069$).

Self-Talk. No significant relationship exists between the use of ST for competition and receiving formal training in ST ($X^2 (1, N = 28) = 1.87, p = .172$), (Yates' correction ($1, N = 28$) = .830, $p = .362$).

Emotional Control. No significant relationship exists between the use of EC for competition and receiving formal training in EC ($X^2 (1, N = 28) = 1.45, p = .229$).

Automaticity. No significant relationship exists between the use of AU for competition and receiving formal training in AU ($X^2 (1, N = 27) = 1.98, p = .160$), (Yates' correction ($1, N = 27$) = .661, $p = .416$).

Hypothesis (8b)

For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during rehabilitation will be the same for participants who have either received or not received formal training in this particular skill.

Negative Thinking. No significant relationship exists between use of NT during rehabilitation and receiving formal training in NT. ($X^2 (1, N = 28) = 4.55, p = .033$), (Yates' correction ($1, N = 28$) = 1.81, $p = .178$).

Attentional Control. No significant relationship exists between the use of AC during rehabilitation and receiving formal training in AC ($X^2 (1, N = 28) = 7.37, p = .007$), (Yates' correction ($1, N = 28$) = 5.25, $p = .022$).

Goal Setting. No significant relationship exists between the use of GS during rehabilitation and receiving formal training in GS ($X^2 (1, N = 28) = .587, p = .443$), (Yates' correction ($1, N = 28$) = .000, $p = 1.00$).

Imagery Training. No significant relationship was found between use of IT during rehabilitation and receiving formal training in IT. ($X^2 (1, N = 28) = 6.89, p = .009$).

Relaxation. No significant relationship exists between the use of RX during rehabilitation and receiving formal training in RX ($X^2 (1, N = 28) = 7.04, p = .008$).

Activation. No significant relationship exists between the use of AV during rehabilitation and receiving formal training in AV. ($X^2 (1, N = 26) = 6.95, p = .008$); (Yates' correction ($1, N = 26$) = 4.97, $p = .026$).

Self-Talk. No significant relationship exists between the use of ST during rehabilitation and receiving formal training in ST ($X^2 (1, N = 28) = .003, p = .954$), (Yates' correction ($1, N = 28$) = .000, $p = 1.00$).

Emotional Control. No significant relationship exists between the use of EC during rehabilitation and receiving formal training in EC ($X^2 (1, N = 28) = .738, p = .390$).

Automaticity. No significant relationship exists between the use of AU during rehabilitation and receiving formal training in AU ($X^2 (1, N = 27) = .051, p = .822$), (Yates' correction ($1, N = 27$) = .000, $p = 1.00$).

Hypothesis (9a)

For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during competition will be the same among participants at low and high levels of adherence to rehabilitation.

Negative Thinking. No significant relationship exists between the use of NT for competition and being classified as either low or high on the SIRAS ($X^2 (1, N = 28) = .021, p = .885$), (Yates' correction ($1, N = 28$) = .000, $p = 1.00$).

Attentional Control. No significant relationship exists between the use of AC for competition and being classified as either low or high on the SIRAS ($X^2 (1, N = 28) = .914, p = .339$), (Yates' correction ($1, N = 28$) = .303, $p = .582$).

Goal Setting. A chi-square was unable to be computed because it was found that all participants used goal setting for competition.

Imagery Training. No significant relationship exists between the use of IT for competition and being classified as either low or high on the SIRAS ($X^2 (1, N = 28) = 2.67, p = .102$).

Relaxation. No significant relationship exists between the use of RX for competition and being classified as either low or high on the SIRAS ($X^2 (1, N = 28) = .001, p = .978$).

Activation. No significant relationship exists between the use of AV for competition and being classified as either low or high on the SIRAS ($X^2 (1, N = 26) = 1.197, p = .274$); (Yates' correction ($1, N = 28$) = .431, $p = .512$).

Self-Talk. No significant relationship exists between the use of ST for competition and being classified as either low or high on the SIRAS ($X^2 (1, N = 28) = .048, p = .827$), (Yates' correction ($1, N = 28$) = .000, $p = 1.00$).

Emotional Control. No significant relationship exists between the use of EC for competition and being classified as either low or high on the SIRAS ($X^2 (1, N = 28) = 3.88, p = .049$).

Automaticity. No significant relationship exists between the use of AU for competition and being classified as either low or high on the SIRAS ($X^2 (1, N = 27) = 1.01, p = .315$), (Yates' correction ($1, N = 27$) = .213, $p = .644$).

Hypothesis (9b)

For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during rehabilitation will be the same among participants at low and high levels of adherence to rehabilitation.

Negative Thinking. No significant relationship exists between the use of NT during rehabilitation and being classified as either low or high on the SIRAS ($X^2 (1, N = 28) = .444, p = .505$), (Yates' correction ($1, N = 28$) = .068, $p = .794$).

Attentional Control. No significant relationship exists between the use of AC during rehabilitation and being classified as either low or high on the SIRAS ($X^2 (1, N = 28) = 3.13, p = .077$), (Yates' correction ($1, N = 28$) = 1.86, $p = .173$).

Goal Setting. No significant relationship exists between the use of GS during rehabilitation and being classified as either low or high on the SIRAS ($X^2 (1, N = 28) = .011, p = .916$), (Yates' correction ($1, N = 28$) = .000, $p = 1.00$).

Imagery Training. No significant relationship exists between the use of IT during rehabilitation and being classified as either low or high on the SIRAS ($X^2 (1, N = 28) = .537, p = .464$).

Relaxation. No significant relationship exists between the use of RX during rehabilitation and being classified as either low or high on the SIRAS ($X^2 (1, N = 28) = .144, p = .705$).

Activation. No significant relationship exists between the use of AV during rehabilitation and being classified as either low or high on the SIRAS ($X^2 (1, N = 26) = .735, p = .391$).

Self-Talk. No significant relationship exists between the use of ST during rehabilitation and being classified as either low or high on the SIRAS ($X^2 (1, N = 28) = .480, p = .488$).

Emotional Control. No significant relationship exists between the use of EC during rehabilitation and being classified as either low or high on the SIRAS ($X^2 (1, N = 28) = 2.67, p = .102$).

Automaticity. No significant relationship exists between the use of AU during rehabilitation and being classified as either low or high on the SIRAS ($X^2 (1, N = 27) = .011, p = .918$), (Yates' correction ($1, N = 27$) = .000, $p = 1.00$).

Hypothesis (10a)

For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during competition will be the same among male and female participants.

Negative Thinking. No significant relationship exists between the use of NT for competition and gender ($X^2 (1, N = 28) = 5.24, p = .022$), (Yates' correction ($1, N = 28$) = 3.55, $p = .060$).

Attentional Control. No significant relationship exists between the use of AC for competition and gender ($X^2 (1, N = 28) = .021, p = .885$); (Yates' correction ($1, N = 28$) = .000, $p = 1.00$).

Goal Setting. A chi-square was unable to be computed because it was found that all participants used goal setting for competition.

Imagery Training. No significant relationship exists between the use of IT for competition and gender ($X^2 (1, N = 28) = 5.81, p = .016$).

Relaxation. No significant relationship exists between the use of RX for competition and gender ($X^2 (1, N = 28) = 5.07, p = .024$).

Activation. No significant relationship exists between the use of AV for competition and gender ($X^2 (1, N = 28) = 1.20, p = .274$), (Yates' correction ($1, N = 28$) = .431, $p = .512$).

Self-Talk. No significant relationship exists between the use of ST for competition and gender ($X^2 (1, N = 28) = 1.20, p = .274$), (Yates' correction ($1, N = 28$) = .431, $p = .512$).

Emotional Control. No significant relationship exists between the use of EC for competition and gender ($X^2 (1, N = 28) = 3.88, p = .049$).

Automaticity. No significant relationship exists between the use of AU for competition and gender ($X^2 (1, N = 27) = 1.01, p = .315$), (Yates' correction ($1, N = 27$) = .213, $p = .644$).

Hypothesis (10b)

For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during rehabilitation will be the same among male and female participants.

Negative Thinking. No significant relationship exists between the use of NT during rehabilitation and gender ($X^2 (1, N = 28) = 9.61, p = .002$), (Yates' correction ($1, N = 28$) = 7.26, $p = .007$).

Attentional Control. No significant relationship exists between the use of AC during rehabilitation and gender ($X^2 (1, N = 28) = 3.13, p = .077$), (Yates' correction ($1, N = 28$) = 1.86, $p = .173$).

Goal Setting. No significant relationship exists between the use of GS during rehabilitation and gender ($X^2 (1, N = 28) = .011, p = .916$), (Yates' correction ($1, N = 28$) = .000, $p = 1.00$).

Imagery Training. No significant relationship exists between the use of IT during rehabilitation and gender ($X^2 (1, N = 28) = 2.23, p = .136$).

Relaxation. No significant relationship exists between the use of RX during rehabilitation and gender ($X^2 (1, N = 28) = 3.59, p = .058$).

Activation. No significant relationship exists between the use of AV during rehabilitation and gender ($X^2 (1, N = 26) = 1.42, p = .234$).

Self-Talk. No significant relationship exists between the use of ST during rehabilitation and gender ($X^2 (1, N = 28) = .738, p = .390$).

Emotional Control. No significant relationship exists between the use of EC during rehabilitation and gender ($X^2 (1, N = 28) = 2.67, p = .102$).

Automaticity. No significant relationship exists between the use of AU during rehabilitation and gender ($X^2 (1, N = 27) = 3.06, p = .080$), (Yates' correction ($1, N = 27$) = 1.66, $p = .198$).

Hypothesis (11a)

For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during competition will be the same among under-class (first and second year) students and upper-class (third and fourth year) students.

Negative Thinking. No significant relationship exists between the use of NT for competition and class status ($X^2 (1, N = 28) = 1.47, p = .225$), (Yates' correction ($1, N = 28$) = .655, $p = .418$).

Attentional Control. No significant relationship exists between the use of AC for competition and class status ($X^2 (1, N = 28) = .164, p = .686$), (Yates' correction ($1, N = 28$) = .000, $p = 1.00$).

Goal Setting. A chi-square was unable to be computed because it was found that all participants used goal setting for competition.

Imagery Training. No significant relationship exists between the use of IT for competition and class status ($X^2 (1, N = 28) = 7.34, p = .007$).

Relaxation. No significant relationship exists between the use of RX for competition and class status ($X^2 (1, N = 28) = .144, p = .705$).

Activation. No significant relationship exists between the use of AV for competition and class status ($X^2 (1, N = 28) = 1.71, p = .190$), (Yates' correction ($1, N = 28$) = .762, $p = .383$).

Self-Talk. No significant relationship exists between the use of ST for competition and class status ($X^2 (1, N = 28) = 1.90, p = .663$), (Yates' correction ($1, N = 28$) = .000, $p = 1.00$).

Emotional Control. No significant relationship exists between the use of EC for competition and class status ($X^2 (1, N = 28) = .233, p = .127$).

Automaticity. No significant relationship exists between the use of AU for competition and class status ($X^2 (1, N = 27) = 1.36, p = .244$), (Yates' correction ($1, N = 27$) = .387, $p = .534$).

Hypothesis (11b)

For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during rehabilitation will be the same among under-class (first and second year) students and upper-class (third and fourth year) students.

Negative Thinking. No significant relationship exists between the use of NT during rehabilitation and class status ($X^2 (1, N = 28) = 4.09, p = .043$), (Yates' correction ($1, N = 28$) = 2.62, $p = .106$).

Attentional Control. No significant relationship exists between the use of AC during rehabilitation and class status ($X^2 (1, N = 28) = 4.9, p = .043$), (Yates' correction ($1, N = 28$) = 2.62, $p = .106$).

Goal Setting. No significant relationship exists between the use of GS during rehabilitation and class status ($X^2 (1, N = 28) = 2.15, p = .142$), (Yates' correction ($1, N = 28$) = .538, $p = .463$).

Imagery Training. No significant relationship exists between the use of IT during rehabilitation and class status ($X^2 (1, N = 28) = 1.29, p = .256$).

Relaxation. No significant relationship exists between the use of RX during rehabilitation and class status ($X^2 (1, N = 28) = .571, p = .450$).

Activation. No significant relationship exists between the use of AV during rehabilitation and class status ($X^2 (1, N = 26) = .004, p = .951$).

Self-Talk. No significant relationship exists between the use of ST during rehabilitation and class status ($X^2 (1, N = 28) = .150, p = .699$).

Emotional Control. No significant relationship exists between the use of EC during rehabilitation and class status ($X^2 (1, N = 28) = 3.74, p = .053$).

Automaticity. No significant relationship exists between the use of AU during rehabilitation and class status ($X^2 (1, N = 27) = 1.06, p = .303$); (Yates' correction ($1, N = 27$) = .321, $p = .571$).

Hypothesis (12a)

For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during competition will be the same among participants who have mild, moderate, or severe levels of injury according to athletic training staff.

Negative Thinking. No significant relationship exists between the use of NT for competition and injury severity ($X^2 (1, N = 28) = .451, p = .798$).

Attentional Control. No significant relationship exists between the use of AC for competition and injury severity ($X^2 (1, N = 28) = .451, p = .798$).

Goal Setting. A chi-square was unable to be computed because it was found that all participants used goal setting for competition.

Imagery Training. No significant relationship exists between the use of IT for competition and injury severity ($X^2 (1, N = 28) = .521, p = .770$).

Relaxation. No significant relationship exists between the use of RX for competition and injury severity ($X^2 (1, N = 28) = 5.40, p = .067$).

Activation. No significant relationship exists between the use of AV for competition and injury severity ($X^2 (1, N = 28) = 2.86, p = .239$).

Self-Talk. No significant relationship exists between the use of ST for competition and injury severity ($X^2 (1, N = 28) = 1.40, p = .497$).

Emotional Control. No significant relationship exists between the use of EC for competition and injury severity ($X^2 (1, N = 28) = 3.67, p = .160$).

Automaticity. No significant relationship exists between the use of AU for competition and injury severity ($X^2 (1, N = 27) = .647, p = .724$).

Hypothesis (12b)

For the population sampled, the proportion of participants who report to either using or not using (one of nine sport psychology strategies) during rehabilitation will be the same among participants who have mild, moderate, or severe levels of injury according to athletic training staff.

Negative Thinking. No significant relationship exists between the use of NT during rehabilitation and injury severity ($X^2 (1, N = 28) = 2.25, p = .325$).

Attentional Control. No significant relationship exists between the use of AC during rehabilitation and injury severity ($X^2 (1, N = 28) = .195, p = .907$).

Goal Setting. No significant relationship exists between the use of GS during rehabilitation and injury severity ($X^2 (1, N = 28) = 3.77, p = .828$).

Imagery Training. No significant relationship exists between the use of IT during rehabilitation and injury severity ($X^2 (1, N = 28) = 1.65, p = .439$).

Relaxation. No significant relationship exists between the use of RX during rehabilitation and injury severity ($X^2 (1, N = 28) = 1.90, p = .388$).

Activation. No significant relationship exists between the use of AV during rehabilitation and injury severity ($X^2 (1, N = 26) = 1.33, p = .516$).

Self-Talk. No significant relationship exists between the use of ST during rehabilitation and injury severity ($X^2 (1, N = 28) = 2.70, p = .259$).

Emotional Control. No significant relationship exists between the use of EC during rehabilitation and injury severity ($X^2 (1, N = 28) = .521, p = .770$).

Automaticity. No significant relationship exists between the use of AU during rehabilitation and injury severity ($X^2 (1, N = 27) = 3.43, p = .180$).

Additional Analyses

Participants were recruited from both NCAA Division I and II institutions. Thus, it was important to explore potential differences with this independent variable when looking at the following dependent variables: TOPS Competition subscale scores for self-talk, goal setting, imagery, and relaxation; and scores on SSS-C types for listening support, emotional support, emotional challenge support, reality confirmation support, task appreciation support, and task challenge support.

A MANOVA was computed to determine whether or not differences exist between Division I and II participants on TOPS Competition subscale scores for self-talk, goal setting,

imagery, and relaxation; and the following types of social support assessed by the SSS-C:

Listening support, emotional support, emotional challenge support, reality confirmation support, task appreciation support, and task challenge support. An ANOVA was computed to examine the difference between low and high adherers to athletic injury rehabilitation on the total SSS-C score.

A significant multivariate main effect for sport psychology strategies was found, $F(4, 30) = 7.30$, $p < .001$, $ES = .49$. Division II participants had higher scores than Division I participants on goal setting, self-talk, and relaxation strategies used for competition. A box test was conducted to test the assumption of homogeneity of the variance-covariance matrices, $F = 2.40$, $p = .008$. This significant result indicates that the variance-covariance matrices are not equal. See Table 6 for means and standard deviations of the scores on these sport psychology strategies.

No significant multivariate main effect for social support types was found, $F(6, 22) = 1.36$, $p = .28$, $ES = .27$. A box test was conducted to test the assumption of homogeneity of the variance-covariance matrices, $F = 2.12$, $p = .002$. This significant result indicates that the variance-covariance matrices are not equal. See Table 7 for means and standard deviations of the scores on these types of social support.

The difference between Division I and II participant's total SSS-C score was tested using a one-way ANOVA. No significant difference was found, $F(1, 27) = 4.24$, $p = .094$. See Table 7 for the mean and standard deviation of total SSS-C scores.

Because differences were found between Division I and II participants on some of the sport psychology strategies, an examination of average scores on the TOPS Competition subscales scores for self-talk, goal setting, imagery, and relaxation was done for the different athletic teams in this study. Although no statistical test of differences was done with this examination, it

Table 6.

*Means and Standard Deviations of TOPS Competition Subscales as a Function of NCAA**Division*

Factor	Group	Mean	Std. Deviation	N
Self-talk*	Div. I	3.00	0.85	18
	Div. II	3.66	0.78	17
	Total	3.32	0.87	35
Imagery	Div. I	3.13	0.86	18
	Div. II	3.66	0.89	17
	Total	3.39	0.90	35
Goal-setting**	Div. I	3.35	0.90	18
	Div. II	4.40	0.59	17
	Total	3.86	0.92	35
Relaxation**	Div. I	2.90	0.61	18
	Div. II	3.66	0.34	17
	Total	3.27	0.63	35

* $p < .05$ ** $p < .01$

Table 7.

Means and Standard Deviations of Social Support Types and Total Social Support as a

Function of NCAA Division

Factor	Group	Mean	Std. Deviation	N
Listening support	Div. I	16.93	4.09	14
	Div. II	18.93	6.20	15
	Total	17.97	5.30	29
Emotional support	Div. I	16.79	3.77	14
	Div. II	20.07	5.35	15
	Total	18.48	4.87	29
Emotional Challenge	Div. I	11.86	4.40	14
	Div. II	14.07	4.53	15
	Total	13.00	4.53	29
Reality Confirmation	Div. I	13.57	3.11	14
	Div. II	15.00	2.51	15
	Total	14.31	2.86	29
Task Appreciation	Div. I	14.36	3.67	14
	Div. II	16.93	4.50	15
	Total	15.69	4.25	29
Task Challenge	Div. I	12.43	3.92	14
	Div. II	16.60	4.34	15
	Total	14.59	4.59	29
Total Social Support	Div. I	112.29	23.19	14
	Div. II	130.73	24.92	15
	Total	121.83	25.46	29

* $p < .05$

** $p < .01$

Table 8.

Means and Standard Deviations of TOPS Competition Subscales as a Function of Athletic Team

*Team (n)	Sport Psychology Strategies Mean (Standard Deviation)			
	Self-Talk	Goal Setting	Imagery	Relaxation
Div I Football (7)	2.25 (.20)	2.61 (.32)	2.32 (.28)	2.39 (.28)
Div II Football (7)	3.50 (.96)	4.36 (.56)	3.22 (.99)	3.57 (.35)
Football (14)	2.88 (.93)	3.48 (1.0)	2.77 (.84)	2.98 (.68)
Women's Rowing (6)	3.28 (.63)	3.60 (.68)	3.47 (.71)	3.16 (.53)
Baseball (2)	4.88 (.18)	5.00 (0.0)**	4.75 (.35)	3.88 (.18)
Women's Volleyball (3)	3.83 (.95)	3.75 (1.09)	3.67 (.88)	3.83 (.29)
Women's Soccer (2)	3.50 (.35)	4.38 (.53)	3.38 (.18)	3.50 (0.0)**
Softball (2)	3.38 (.18)	4.13 (.18)	4.00 (0.0)**	3.50 (.35)
Women's Swimming (2)	3.75 (0.0)**	4.88 (.18)	4.50 (.35)	4.13 (.18)
Div I Total (18)	3.00 (.85)	3.35 (.90)	3.13 (.86)	2.90 (.61)
Div II Total (17)	3.66 (.78)	4.40 (.59)	3.66 (.89)	3.66 (.34)
Total (35)	3.32 (.87)	3.86 (.92)	3.39 (.90)	3.27 (.63)

*Track and Field and Women's Tennis were excluded from this table because they had only one participant for each team

**These teams had participants with the same score making it a constant, thus no standard deviation was calculated.

appeared that the average scores for the Division I football team was noticeably smaller than their counterparts. See Table 8 to compare the means and standard deviations of these scores for the different teams and groups. The relative low scores from the Division I football team may explain the differences found between Division I and II student-athletes on some of the sport psychology strategies.

Summary

A number of statistical tests were computed to test differences between low and high adherers to athletic injury rehabilitation on a limited number of sport psychology strategies used for competition and on a number of social support types. Differences were not found between these two groups on both sets of dependent variables. Tests were also computed to explore the relationships between sport psychology strategies, social support types, and adherence to athletic rehabilitation. Significant relationships were not found between adherence and any of the sport psychology strategies or between adherence and any of the social support types.

Also, investigated were participants' use of sport psychology skills for competition and during rehabilitation, and their experience with formal training in any of the sport psychology skills. Along these lines, how use and training of these skills differed due to level of SIRAS scores, gender, class status, and severity of injury was examined as well. Generally, a greater proportion of participants were found to use sport psychology skills in both competition and rehabilitation. A greater proportion of participants were not found to have received formal training in these skills and to have used them in both competition and rehabilitation. No differences in proportion of participants were found to use these skills because of differences in SIRAS level, gender, class-status, or severity of injury.

Differences between Division I and II participants were examined on sport psychology strategies used in competition and social support types. Significant differences were found between the different Divisions on some of the sport psychology strategies, but no differences were found for social support types. It appeared that the scores on sport psychology strategies for the Division I football players may explain this difference. These findings will be explained and discussed in further detail in the next chapter.

Chapter 5

Discussion

Research to date has not thoroughly examined the relationships between a comprehensive set of sport psychology skills and adherence to athletic injury rehabilitation. This is also the case when considering the relationships between a set of social support types and adherence to athletic injury rehabilitation. The purpose of the present study was to investigate the relationships between specific sport psychology strategies (goal setting, imagery, relaxation, and self-talk), specific types of social support (listening support, emotional support, emotional challenge support, reality confirmation support, task appreciation support, and task challenge support), and adherence to athletic injury rehabilitation. Participants' use of sport psychology strategies for competition and during rehabilitation and their experience with formal training in sport psychology was also examined. Moreover, differences on sport psychology strategies and types of social support as a function of participants' NCAA Division I or II affiliation was explored. The findings in this study will be discussed and explanations will be offered. An integration of findings in previous studies in the literature will be provided. In addition, implications of the findings in this study will be given. Limitations of this study will be described as well. Given this information, directions in future research in the areas addressed here will be recommended.

Differences between Low and High Adherence to Injury Rehabilitation

A comparison between low and high adherers to athletic injury rehabilitation was done to see if differences exist in their use of goal setting, imagery, relaxation, and self-talk in competition. No difference was found between these two groups on their use of these skills. This was surprising given the findings in previous literature.

Duda et al., (1989) found that athletes who displayed greater adherence to rehabilitation were more goal directed or self-motivated. Goal setting and imagery, among other strategies were determined to be effective interventions for athletes undergoing rehabilitation (Evans et al., 2000). Athletes, suffering from either ankle or knee injuries, who were classified as fast healers (recovery in five or less weeks) had a greater tendency to report using goal setting, positive self-talk, and healing imagery (Ievleva & Orlick, 1991). Among patients at an orthopedic physical-therapy clinic Scherzer et al., (2001) found a positive association between goal setting and adherence, a positive correlation between positive self-talk and home exercise completion, but found no relationship between healing imagery and adherence to rehabilitation. It is less clear what relationship exists between the use of relaxation techniques and adherence to rehabilitation. It has been suggested that relaxation strategies are potentially helpful to injured athletes in rehabilitation (Crossman, 1997), particularly because it can be used for flexibility gain and reducing pain (Shaffer & Wiese-Bjornstal, 1999). Indeed, Ross and Berger (1996) trained injured recreational athletes, who had sustained knee injuries, in stress inoculation training and found these patients had reduced both subjective pain and anxiety. More importantly, these patients needed fewer days to recover. However, when Francis, Andersen, and Maley (2000) surveyed the views of Australian physiotherapists and professional basketball players it was found that both physiotherapists and athletes did not think relaxation and imagery strategies were useful techniques in the rehabilitation process.

A number of reasons may explain why differences were not found between the low and high adherers to athletic injury rehabilitation in this study on the sport psychology strategies that were assessed. The sport psychology strategies were treated as a global construct and a test of differences was done with this in mind. If these strategies are independent of one another, then it

may have been wiser to test these strategies separately. This may have revealed differences between low and high adherers. Another factor that may have decreased the chances of finding significant differences could have been due to the low sample size used in this study.

Another comparison between low and high adherers to athletic injury rehabilitation was also done to see if differences exist in participants' report of available social support. Again, no differences were found between these two groups and their reported availability of the types of social support defined and used in this study. This result was not as surprising given the mixed findings of social support and its utility to athletic injury rehabilitation.

For example, in a qualitative study, Bianco and Orlick (1996) concluded that social support contributed to enhanced coping and increased motivation in physical therapy adherence. In another study, different types of social support were found to be related to physiotherapist (athletic trainer)-rated adherence at different stages of rehabilitation (Johnston & Carroll, 2000). More specifically, adherence was positively related with satisfaction with practical support at the beginning of rehabilitation while in the middle of rehabilitation adherence was positively related with satisfaction with emotional support. In a study that assessed injured athletes' perceptions of social support provided by head coaches, assistant coaches, and athletic trainers, pre-injury and during rehabilitation (Robbins & Rosenfeld, 2001), athletic trainers were found to be an important source of social support. During rehabilitation, injured athletes reported that athletic trainers' listening, task appreciation, task challenge, and emotional challenge support were more important to their rehabilitation than receiving the same type of support from head or assistant coaches. Research contradicting the positive impact of social support has been documented as well.

For example, Hardy et al. (1991) investigated the role of social support in the relationship between life stress and injury. They suggested that social support can have a detrimental effect to injured athletes. They observed that as providers of social support increased, injury frequency for male athletes increased as well. They reasoned that the social support these athletes received may have served as a distraction to their performance and increased their chances of becoming injured. Quinn and Fallon (2000) go further, when they reported that a significant predictor of quicker recovery of athletic injury was having less social support. They suggested that although social support may be important in a general manner, it does not necessarily provide practical help for an athletes' rehabilitation.

Thus, it probably should not come as a surprise that no differences were found between low and high adherers of athletic injury rehabilitation when it concerns social support. Perhaps performing separate analyses of differences, versus treating the types of social support as a global construct, may have revealed some effects. There are also concerns that the SSS-C (Richman et al., 1993) used to assess social support in this study may not be appropriate to use for researching different types of social support (Rees et al., 2000) and the types should be combined instead. However, differences on total social support score were tested in this study with similar results.

Relationship between Adherence and Sport Psychology Strategies and Social Support

The relationship between adherence to athletic injury rehabilitation and specific sport psychology skills used in competition was also examined. No significant positive relationships were found between adherence and goal setting, imagery, relaxation, or self-talk, used in competition among the participants in this study. This was surprising given the findings in previous research and literature.

From previous literature, already cited, it is clear that the use of goal setting has a positive relationship with adherence to rehabilitation (Duda et al., 1989; and Scherzer et al., 2001). Duda et al. (1989) explains that individuals who are goal directed tend to be self-motivated and place greater emphasis on mastery of goals in their sport. So, it is reasonable to suggest that if an injured athlete is self-motivated to recover than they are more likely to follow their rehabilitation program and strive to reach relevant goals

The positive relationship between goal setting and athletic injury rehabilitation is supported by other studies that were not focused on adherence. Wiese et al. (1991) found that the use of goal setting was rated by athletic trainers to be an important factor in identifying athletes who coped with injury most successfully. Also, focusing on short-term goals was rated as important for facilitating athlete's ability to cope with injury rehabilitation. Moreover, athletic trainers having knowledge about how to set realistic goals was rated as important to very important (Wiese et al., 1991). Not only does goal setting seem to impact adherence to rehabilitation, but it can also enhance the outcome of rehabilitation (Theodorakis, Beneca, Malliou, & Goudas, 1997).

The utility of relaxation techniques to positively impact adherence to rehabilitation garners less support from the literature. Most studies have explored and reported the positive impact of relaxation strategies on rehabilitation (Crossman, 1997), pain reduction and flexibility in rehabilitation (Shaffer & Wiese-Bjornstal, 1999), and reduction in anxiety and pain and fewer recovery days (Ross & Berger, 1996). However, it is not known if a previous study has specifically looked at the relationship between use of relaxation strategies and adherence to rehabilitation. One might be inclined to encourage the training and use of relaxation strategies in athletic rehabilitation given the literature described above. However, remember that Francis et al.

(2000) surveyed the views of Australian physiotherapists (athletic trainers) and professional basketball players and found that both physiotherapists and athletes did not think relaxation and imagery strategies were useful techniques in the rehabilitation process.

The use of imagery has also been thought to be a useful intervention for sport injury rehabilitation among college students rating their preferences for psychological interventions for a hypothetical injured athlete (Brewer et al., 1994); and among injured athletes in a qualitative study done to assess the efficacy of a number of interventions including imagery (Evans, et al., 2000). However, in a more controlled and externally valid study, Scherzer et al. (2001) found no significant associations between self-reported use of healing imagery and four indices of sport injury rehabilitation adherence among 54 physical therapy patients undergoing rehabilitation after ACL reconstruction.

Scherzer and her colleagues (2001) did find a positive relationship between positive self-talk and one type of adherence (home rehabilitation exercises). Ievleva and Orlick (1991) also found that positive self-talk is associated with fast recovery of knee and/or ankle injuries among sport medicine clinic patients.

The relationship between adherence to athletic injury rehabilitation and specific types of social support (and overall social support) was also examined. No significant positive relationships were found between adherence and the following types of social support: Listening support, emotional support, emotional challenge support, task appreciation support, task challenge support, reality confirmation, and overall social support. Although it was expected that relationships would be found between adherence and some of the social support types it was not a complete surprise that no relationships were found given the inconsistent literature on social support and athletic injury rehabilitation.

For example, as previously noted, social support has been found to enhance coping and increase motivation in adherence to physical therapy (Bianco & Orlick, 1996). At the beginning of athletic injury rehabilitation, satisfaction with practical support was shown to be positively related to adherence, while satisfaction with emotional support was positively related to adherence in the middle of rehabilitation (Johnston & Carroll, 2000). Evans et al. (2000) found that task support and task challenge were used by injured athletes to enhance motivation and adherence in the early and middle stages of rehabilitation and used in the latter and reentry stages to enhance self-efficacy. Also, recall that Robbins and Rosenfeld (2001) assessed injured athletes' perceptions of social support provided by head coaches, assistant coaches, and athletic trainers, pre-injury and during rehabilitation and that they found athletic trainers to be an important source of social support. During rehabilitation, injured athletes reported that athletic trainers' listening, task appreciation, task challenge, and emotional challenge support were more important to their rehabilitation than receiving the same type of support from head or assistant coaches (Robbins & Rosenfeld, 2001). Evidence also exists that implies a negative relationship between social support and athletic injury rehabilitation. Hardy et al. (1991) suggested that social support can have a negative impact on some athletes because social support may become a stressful distraction. Moreover, having less social support has been found to be a significant predictor of faster recovery of athletic injury (Quinn & Fallon, 2000). Unfortunately, the present study does little to clear up previous research on the utility of social support for adherence and outcome of athletic injury rehabilitation.

One of the reasons why this study was initiated was to determine if athletes who are low in adherence to athletic injury rehabilitation are also low in the use of sport psychology skills and perceived social support. In addition, it was thought that different sport psychology skills and

types of social support would be related to greater adherence. If this was found, then there would be some justification to develop programming that would identify injured athletes who are potentially low in adherence and provide them training in specific sport psychology strategies and provide them types of social support that are more likely to assist in their rehabilitation. The current results do not support these notions. However, with further research there may be justification to consider using certain sport psychology strategies and types of social support to facilitate greater adherence to athletic injury rehabilitation.

Use of Sport Psychology Strategies: Competition, Rehabilitation, and Formal Training

Another area that was extensively investigated was the sport psychology strategies student-athletes in this study used in competition and rehabilitation and the experiences they may have had receiving formal training in any of these strategies. Note that the list of strategies explored here involves a more exhaustive list than those sport psychology skills described previously. They include: negative thinking, attentional control, goal setting, imagery training, relaxation, activation, self-talk, emotional control, and automaticity.

According to the results, more student-athletes used attentional control, imagery training, relaxation, self-talk, and emotional control in both competition and rehabilitation than student-athletes who used these skills for only competition or only during rehabilitation. Equal percentages of student-athletes used negative thinking, activation, and automaticity in both competition and rehabilitation as those who used it in just competition or just rehabilitation. All student-athletes used goal setting in competition and a vast majority used it in rehabilitation. This finding seems to imply that if athletes use a psychological skill in one area then they have a tendency to generalize its use in at least one other area. For example, if an athlete uses relaxation

for competition, then they will probably use this skill in another setting, such as during rehabilitation.

No studies appear to exist that have simultaneously investigated athletes' use of sport psychology skills in both competition and rehabilitation. However, there are previous studies that do lend support to athletes using these skills in one or the other setting.

In a survey of 55 female lacrosse players, Heishman and Bunker (1989) found that nearly half of these athletes used imagery before competition. In addition, 56% of this sample used self-talk and one third used relaxation before competition. Ungerleider and Golding (1991) investigated the use of imagery among track and field athletes at an Olympic Trials event. They found that the track event athletes used imagery 81.5% of the time while field event athletes used imagery 92.7% of the time. In a survey of professional tennis players Defrancesco and Burke (1997) reported that the psychological skills used most often were imagery, pre-service routine, relaxation, goal setting, and self-talk. Athletes have also been found to use psychological skills in rehabilitation.

Ievleva and Orlick (1991) found that injured athletes who healed quickest were also athletes who scored higher on use of goal setting, positive self-talk, and use of healing imagery. The authors found no such finding with the use of stress control. Also, Scherzer et al. (2001) concluded that goal setting was positively associated with home exercise completion and adherence ratings compiled by rehabilitation practitioners such as a physical therapist. Positive self-talk was also related to home exercise completion among orthopedic physical therapy patients. No such relationship was found with the use of imagery. In addition, relaxation strategies have had a positive impact on rehabilitation (Crossman, 1997), pain reduction and flexibility in rehabilitation (Shaffer & Wiese-Bjornstal, 1999), and reduction in anxiety and pain

and fewer recovery days (Ross & Berger, 1996). The use of attentional control, activation, and emotional control has not been explored in athletic injury rehabilitation. Student-athletes' reported use of these skills during their rehabilitation in this study would justify further research exploring how these skills are used by injured athletes. It is interesting to note that in a survey of athletic trainers on the use of psychological skills with injured athletes they reported that having a positive attitude, intrinsic motivation, and having emotional maturity were important characteristics in distinguishing athletes who cope most successfully with injury (Wiese et al., 1991). However, Wiese et al. (1991) also found that athletic trainers rated having knowledge about teaching emotional control to deal with injured athletes as a relatively unimportant strategy.

Different results were found when examining participants' use of sport psychology skills in competition and their experience of receiving formal training in these skills. It was found that a greater proportion of student-athletes used relaxation and received formal training in this skill than student-athletes who either only used these skills in competition or just received formal training in these skills. Equal percentages of student-athletes used negative thinking, attentional control, imagery training, activation, self-talk, emotional control, and automaticity and received formal training in these skills as student-athletes who either just used these skills in competition or just received formal training in these skills. All participants reported using goal setting in competition and receiving formal training in it.

Similar results were found with student-athletes' use of sport psychology skills in rehabilitation and their experience of receiving formal training in these skills. However, no skill was found to be used by proportionally more students in both situations than in just one or the other setting. Equal percentages of student-athletes reported using negative thinking, attentional

control, imagery training, goal setting, activation, self-talk, relaxation, emotional control, and automaticity and receiving formal training in these skills as student-athletes who reported using these skills during rehabilitation, but not receiving formal training in them and vice versa.

These results seem to imply that the provision of formal training in any of the sport psychology skills examined in this study is not related to its use in competition or rehabilitation. This would seem to indicate that creating opportunities for formal training in these skills for student-athletes would not necessarily translate into its use in two settings that would have practical benefits for this population. These results either call into question the utility of formal training in these skills or it begs the question: Why are not more of these student-athletes, who have reported to have been exposed to formal training in these skills, using them for competition and during rehabilitation? However, it should be noted that the low sample size in this study makes it difficult to interpret these findings in a meaningful manner.

Student-athletes' use of sport psychology skills for competition and during rehabilitation and the following were also explored: level of adherence to athletic injury rehabilitation, gender, class-status, and severity of injury. For all sport psychology skills, level of adherence to athletic injury rehabilitation, gender, class-status, and severity of injury was found to make no difference in the proportion of participants who used any of these skills in either competition or rehabilitation. It was not surprising that level of adherence did not differentiate use of the sport psychology skills for competition and during rehabilitation. This was consistent with the majority of the results in this study. However, this does contradict findings by Duda et al. (1989) and Scherzer et al. (2001) discussed earlier in this section. The finding that gender, class-status, and injury severity has little impact on participants' reported use of sport psychology strategies appears to be consistent with existing literature that has not reported differences in use due to

gender or class-status. One study was found that indicated male athletes scored higher on automaticity, but lower on imagery, than their female counterparts (Thomas et al., 1999).

Differences between NCAA Divisions

The student-athletes in this study were recruited from either a NCAA Division I or II. Because of this difference it was important to explore whether or not it had an impact on student-athletes' use of sport psychology skills and their perceived social support.

A difference was found between Division I and Division II student-athletes on sport psychology skills they used, but no difference was found between these two groups on perceived social support. Division II student-athletes reported greater use of goal setting, imagery, and relaxation for competition than Division I student-athletes. No difference was found for use of self-talk. No differences were found between Division I and II participants in perceived social support with any of the six types of social support or total social support. The difference in use of sport psychology skills runs counter to findings by Thomas et al., (1999). Even though Thomas et al. (1999) did not look at differences in the use of sport psychology strategies between different NCAA divisions, their findings suggest that athletes at higher levels of competition will report higher use of sport psychology strategies. Perhaps athletes in this study who participated at the Division I level relied more on their physical talents and athletes at the Division II level compensated by turning to sport psychology strategies. This may be more true for the Division I football players in this study given their relatively low scores on the sport psychology strategies when compared with their counterparts. Caution should be used when suggesting that Division I football players, in general, report less use of sport psychology skills when it is possible that this behavior may be limited to those particular participants in this study. In fact, no evidence in the

literature appears to exist that would suggest that collegiate football players at Division I institutions report less use of sport psychology skills than their Division II counterparts.

Summary

The present study did not reveal low and high levels of adherence to athletic injury rehabilitation on student-athletes' use of sport psychology skills and their perceived social support. Also, no significant relationships were found between adherence to athletic injury rehabilitation and student-athletes' use of sport psychology skills and their perceived social support. Convergent and divergent support from the literature was provided and explanations of the results were suggested.

Participants' use of sport psychology skills for competition and during rehabilitation, and their experience with formal training in these skills was also reported. Patterns that reflected participants' use and training emerged. Generally, a greater proportion of participants were found to use sport psychology skills in both competition and rehabilitation. Generally, no differences in proportion of participants were found to have received formal training in these skills and to have used these skills in both competition and rehabilitation. No differences in proportion of participants were found to use these skills because of differences in SIRAS level, gender, class-status, or severity of injury.

Participants were recruited from both NCAA Division I and II schools. Statistical tests of differences were computed and analyzed to examine potential effects on the primary dependent variables. Differences were found between Division I and II student-athletes with some of the sport psychology skills. Division II student-athletes reported using goal setting, imagery, and relaxation more often for competition. No differences were found between these two groups on social support. A review of the literature was provided to help understand the findings in this

study. A discussion of the limitations in this study may also provide some insight about its results. This will be done and suggestions for future research will be given as a conclusion to the present study.

Limitations of the Study

There were a number of limitations to the study that warrant further discussion. First, the low sample size made it challenging to test the hypotheses. With a larger sample size it is possible that differences between low and high adherers to athletic injury rehabilitation and relationships between more of the variables examined may have been uncovered. The problem with a small sample size was most evident in the classification of low and high adherers. A median split with the sample of participants was made, however several participants fell in a middle area and it may have been more appropriate to create a moderate adherers group. This was not done because the number of participants in three groups would have been sufficiently small enough to threaten statistical power. Obviously, a larger sample size would help this challenge.

Additional limitations due to the sample must be noted. The participants for this study were drawn from a convenience sample. In addition to the challenges noted previously, a convenience sample made it difficult to recruit participants in a controlled manner. This might explain the lower turnout of NCAA Division II student-athletes during the second set of data gathering. It also may highlight the need to have access to computers more readily available if a researcher needs participants to complete surveys with a web-based survey system. Asking participants to complete surveys during personally convenient times for them threatens the robustness of this study. Thus, it would be wise to implement greater control and consistency when recruiting participants and gathering data.

Another limitation involves certain characteristics of the participants. It could be viewed as a strength that the sample reflected a diverse group of individuals in that there were similar numbers of males and females, participants from both NCAA Division I and II institutions, athletes from a variety of sports, ethnic majority and minorities represented, and those who sustained a wide variety of injuries. This heterogeneity increases external validity and supports the generalization of the study's results to a larger population. However, it also increases the likelihood that confounding variables are impacting the effects and relationships being examined. The most notable variable is the type and severity of injuries. The type and severity of injury an athlete has can impact their experience with rehabilitation. As noted before participants in this study suffered a great variety of injuries ranging from ankle sprains to anterior cruciate ligament tears. This variable was not controlled for, which makes it challenging to rule out as confounding variable.

As with other studies that require the use of surveys and questionnaires to gather information and data, this researcher relied on the assumption that participants were able to understand and complete the surveys in an honest, accurate manner. This assumption may be inaccurate given the possibility that there may have been some participants with low reading and comprehension skills. A brief interview with each potential participant, inquiring about their level of understanding concerning their participation in the study may have been warranted. Also, participants may become victims of demand characteristics that were inadvertently expressed by the researcher or by the language in the surveys. This may lead participants to respond in ways that reflect the expectations of the researcher. Moreover, participants may respond to surveys that are consistent with the Hawthorne effect. In this situation, participants may respond in ways they feel would most please the researcher because of the special attention

they perceive they are receiving from their selection in a study. It is not known how much of an impact, if any, demand characteristics and the Hawthorne effect had on this study. However, it is important for all researchers to minimize interactions with participants that may change their normal behaviors and to remain as neutral as possible if they must interact with participants.

A final limitation involves the study of social support and rehabilitation. It has been noted that research in this area has been inconsistent and challenging to understand (Brewer, 2001). This may be due to the means in which social support (and rehabilitation) is measured. The measure used to assess social support in this study has its advantages. The primary advantage is that it is able to assess eight types of social support and has been used in athletic injury research before. However, challenges to its psychometric properties have been made (Rees et al., 2000) that question the independence of these eight types of social support and recommend considering the eight scores derived from this measure be viewed as a total social support construct. This was done in the present study with unchanging results. However, the possible limitation of the social support survey used in this study remains an issue. Fortunately, one of the aims of research is to spur future research that takes into consideration results of previous studies and their limitations.

Suggestions for Future Research

The aim of the present study was to explore the role of adherence to athletic injury rehabilitation on the reported use of sport psychology skills and perceived social support among injured student-athletes. It remains unclear how level of adherence can differentiate use of sport psychology skills and perceived social support. It also remains unclear what relationships exist between adherence to athletic injury rehabilitation and sport psychology strategies and types of social support. This line of research needs to be continued and expanded in order to identify sport psychology skills and types of social support that are consistently related to adherence.

With a large enough sample size, regression analyses could be performed instead of correlational studies. Once this is done, the next step would be to develop intervention studies that provide injured athletes with formal training in relevant sport psychology strategies and social support that can facilitate improved adherence to rehabilitation. It would be important for any intervention study to include control groups of injured athletes. With such an intervention study one can investigate the impact of such a program on athletes' actual adherence to rehabilitation and the outcome of rehabilitation. It would also be wise to do similar research on populations of injured athletes with similar injuries. Of course, research could then be replicated to involve different types of injuries. Thus, we can have a clearer idea about what an athlete's sport psychology and social support needs are according to the type and severity of their injury.

A number of steps can be taken that might help future researchers gather larger sample sizes. First, it is important to establish positive, professional relationships with an athletic training staff or staffs. This will help generate discussion and plans of important issues to study and the best way to design a method for study. Also, an athletic training staff will provide access to the participants of interest. Second, the researcher can consider how they might appropriately compensate an athletic training staff and potential participants if they agree to participate in a study. A researcher could provide monetary compensation to both participants and the staff. This option should be agreed upon by the athletic department, the university internal review board, and possibly the NCAA or other athletic conference governing body. Adequate compensation could also involve the provision of educational workshops, presentations, and/or materials to the staff and participants. Lastly, there may be benefits to using a web-based survey system to gather data. However, a traditional paper-pencil format may be more helpful in gathering data with this study's sample, given the time constraints of both student-athletes and athletic trainers.

If further research is to be undertaken in this area, then it should be preceded by research that identifies assessments that can accurately and consistently measure the constructs of interest with an injured athlete population. Given the inconsistency of research investigating social support and athletic injury rehabilitation, a priority needs to be placed on developing a psychometrically sound social support survey that assesses varying dimensions of social support and also identifies the sources of social support.

An additional direction for future research would be to use a longitudinal design. This would allow an investigation of what sport psychology skills are being used and what types of social support are being provided and/or needed at different stages of athletic injury rehabilitation. The degree of adherence at different stages of rehabilitation could also be investigated with this design. Although the direction of future research is limitless, proceeding with the suggestions made here can contribute to the growing body of research examining psychological factors in athletic injury rehabilitation.

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Appendix A

Demographics Questionnaire

Provide your **initials** and the last **4 digits** of your Social Security #: (Your identity will remain confidential, but it is needed to study the relationship between the data you and others provide and the progress of injured athletes' rehabilitation. Rest assured that only the primary researcher will have access to your data.) **Initials:** _____ **SS#:** _____

Age: _____ **Gender:** _____

College or University you attend: _____

Sport you primarily participate in: _____

Class status (please check appropriate space):

___ freshmen ___ sophomore ___ junior ___ senior ___ graduate student

Race/Ethnicity (please check appropriate space):

___ Black/African American ___ American Indian/Native American ___ Asian American

___ White/Caucasian ___ Latino/Hispanic American ___ Pacific Islander

___ Other (please describe your race or ethnicity: _____)

What is your perception of how severe your injury is?

___ mild ___ moderate ___ severe

Appendix B

Sport Injury Rehabilitation Adherence Scale (SIRAS; Brewer et al., 1995)

SIRAS

Patient: _____ Today's Date: _____

Date of injury: _____ Type of Injury: _____

Severity of injury: ____ mild ____ moderate ____ severe

Signature of Athletic Training Staff

x _____

Since the date of injury:

How many appointments for this patient have been scheduled? _____

How many appointments has this patient attended? _____

1. Circle the number that best indicates the intensity with which this patient completes the rehabilitation exercises during their appointments.

1	2	3	4	5
Minimum Effort			Maximum Effort	

2. How frequently does this patient follow your instructions or advice (circle)?

1	2	3	4	5
Never			Always	

3. How receptive is this patient to changes in the rehabilitation program (circle)?

1	2	3	4	5
Very Unreceptive			Very Receptive	

4. Is athlete currently participating in sport?

____ NO

____ Yes, modified/limited (e.g. go as can)

____ Yes, No restrictions

____ Date returned to
modified participation

____ Date returned to *full*
participation

Appendix C

Social Support Scale-Clinical Form (SSS-C; Richman, et al., 1993)

SSS – CF

The following questions focus on individuals in your environment who provide you with help and/or support. Read the definition of the type of support being considered and respond to the questions that follow it. Please answer all the questions as best you can – there are no right or wrong answers. (Remember, these questions are based on how you felt during your rehabilitation). All your responses are strictly confidential.

LISTENING SUPPORT: People who listen to you without giving advice or being judgmental.

1. Write the initials of all the individuals who provide you with listening support. If no one provides you with this support, please indicate “no one.” After each person, indicate the relationship you have with her or him (for example, friend, co-worker, spouse, parent, brother, sister, coach, teammate, athletic trainer).

	Initials	Relationship	Initials	Relationship
Ex:	<u>K.T.</u>	<u>grandmother</u>	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____
	_____	_____	_____	_____

2. In general, how satisfied are you with the overall quality of listening support you receive?

1	2	3	4	5
Very Dissatisfied			Very Satisfied	

3. How difficult would it be for you to obtain more listening support?

1	2	3	4	5
Very Difficult			Very Easy	

4. How important for your overall well-being is it to have one or more persons provide you with listening support?

1	2	3	4	5
Very Unimportant			Very Important	

TASK APPRECIATION: People who acknowledge your efforts and express appreciation for the work you do.

1. Write the initials of all the individuals who provide you with task appreciation. If no one provides you with this support, please indicate “no one.” After each person, indicate the relationship you have with her or him (for example, friend, co-worker, spouse, parent, brother, or sister).

Initials	Relationship	Initials	Relationship
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

2. In general, how satisfied are you with the overall quality of task appreciation you receive?

1 2 3 4 5

Very Dissatisfied

Very Satisfied

3. How difficult would it be for you to obtain more task appreciation?

1 2 3 4 5

Very Difficult

Very Easy

4. How important for your overall well-being is it to have one or more persons provide you with task appreciation?

1 2 3 4 5

Very Unimportant

Very Important

TASK CHALLENGE: People who challenge your way of thinking about your work or activity in order to stretch you, motivate you, and lead you to greater creativity, excitement, and involvement in your work or activity.

1. Write the initials of all the individuals who provide you with task challenge. If no one provides you with this support, please indicate “no one.” After each person, indicate the relationship you have with her or him (for example, friend, co-worker, spouse, parent, brother, or sister).

Initials	Relationship	Initials	Relationship
_____	_____	_____	_____

_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

2. In general, how satisfied are you with the overall quality of task challenge you receive?

1 2 3 4 5

Very Unsatisfied

Very Satisfied

3. How difficult would it be for you to obtain more task challenge?

1 2 3 4 5

Very Difficult

Very Easy

4. How important for your overall well-being is it to have one or more persons provide you with task challenge?

1 2 3 4 5

Very Unimportant

Very Important

EMOTIONAL SUPPORT: People who comfort you and indicate to you that they are on your side and care for you.

1. Write the initials of all the individuals who provide you with emotional support. If no one provides you with this support, please indicate "no one." After each person, indicate the relationship you have with her or him (for example, friend, co-worker, spouse, parent, brother, or sister).

Initials	Relationship	Initials	Relationship
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

2. In general, how satisfied are you with the overall quality of emotional support you receive?

1 2 3 4 5

Very Unsatisfied

Very Satisfied

3. How difficult would it be for you to obtain more emotional support?

1

2

3

4

5

Very Difficult

Very Easy

4. How important for your overall well-being is it to have one or more persons provide you with emotional support?

1

2

3

4

5

Very Unimportant

Very Important

EMOTIONAL CHALLENGE: People who challenge you to evaluate your attitudes, values, and feelings.

1. Write the initials of all the individuals who provide you with emotional challenge. If no one provides you with this support, please indicate "no one." After each person, indicate the relationship you have with her or him (for example, friend, co-worker, spouse, parent, brother, or sister).

Initials

Relationship

Initials

Relationship

2. In general, how satisfied are you with the overall quality of emotional challenge you receive?

1

2

3

4

5

Very Unsatisfied

Very Satisfied

3. How difficult would it be for you to obtain more emotional challenge?

1

2

3

4

5

Very Difficult

Very Easy

4. How important for your overall well-being is it to have one or more persons provide you with emotional challenge?

1

2

3

4

5

Very Unimportant

Very Important

REALITY CONFIRMATION: People who are similar to you – see things the way you do – who help you confirm your perceptions and perspectives of the world and help you keep things in focus.

1. Write the initials of all the individuals who provide you with reality confirmation. If no one provides you with this support, please indicate “no one.” After each person, indicate the relationship you have with her or him (for example, friend, co-worker, spouse, parent, brother, or sister).

Initials

Relationship

Initials

Relationship

2. In general, how satisfied are you with the overall quality of reality confirmation you receive?

1

2

3

4

5

Very Unsatisfied

Very Satisfied

3. How difficult would it be for you to obtain more reality confirmation?

1

2

3

4

5

Very Difficult

Very Easy

4. How important for your overall well-being is it to have one or more persons provide you with reality confirmation?

1

2

3

4

5

Very Unimportant

Very Important

TANGIBLE ASSISTANCE: People who provide you with either financial assistance, products, and/or gifts.

1. Write the initials of all the individuals who provide you with tangible assistance. If no one provides you with this support, please indicate “no one.” After each person, indicate the relationship you have with her or him (for example, friend, co-worker, spouse, parent, brother, or sister).

Initials	Relationship	Initials	Relationship
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

2. In general, how satisfied are you with the overall quality of tangible assistance you receive?

1	2	3	4	5
Very Unsatisfied			Very Satisfied	

3. How difficult would it be for you to obtain more tangible assistance?

1	2	3	4	5
Very Difficult			Very Easy	

4. How important for your overall well-being is it to have one or more persons provide you with tangible assistance?

1	2	3	4	5
Very Unimportant			Very Important	

PERSONAL ASSISTANCE: People who provide you with services or help, such as running an errand for you or driving you somewhere.

1. Write the initials of all the individuals who provide you with personal assistance. If no one provides you with this support, please indicate “no one.” After each person, indicate the relationship you have with her or him (for example, friend, co-worker, spouse, parent, brother, or sister).

Initials	Relationship	Initials	Relationship
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

2. In general, how satisfied are you with the overall quality of personal assistance you receive?

1 2 3 4 5

Very Unsatisfied

Very Satisfied

3. How difficult would it be for you to obtain more personal assistance?

1 2 3 4 5

Very Difficult

Very Easy

4. How important for your overall well-being is it to have one or more persons provide you with personal assistance?

1 2 3 4 5

Very Unimportant

Very Important

Appendix D

Test of Performance Strategies (TOPS; Thomas et al., 1999)

TOPS

This questionnaire measures performance strategies used by athletes in various sport situations. Because individual athletes are very different in their approach to their sport, we expect the responses to be different. We want to stress, therefore, that there are no right or wrong answers. All that is required is for you to be open and honest in your responses.

Throughout the questionnaire, several terms are used which may have different meanings for different individuals. Because of this, these terms are defined below with specific examples to sport where appropriate. ***Please keep these definitions in mind when responding to items with these terms.***

COMPETITION: a game/tournament/meet where individuals or teams perform against each other.

SKILL: a specific element of your sport performance. For example, free throw shooting in basketball or a jump in figure skating.

PERFORMANCE: your execution of specific sport skills during training and competition.

ROUTINE: a set of behaviors that is performed regularly in preparation for your performance in sport. An example may be going through specific stretches while listening to a song on your Walkman prior to every performance.

WORKOUT: a structured practice session to work on various elements of your sport.

VISUALIZATION/IMAGERY/REHEARSAL: these terms refer to the act of picturing in your mind some aspect of your performance. An example would be seeing and feeling yourself execute a specific skill perfectly.

Each of the following items describes a specific situation that you may encounter in your training and competition. Please rate how frequently these situations apply to you on the following scale:

1 = Never
2 = Rarely
3 = Sometimes
4 = Often
5 = Always

Never Rarely Sometimes
Often Always

Please put a circle around your answer

1.	I set realistic but challenging goals for practice.	1	2	3	4	5
2.	I say things to myself to help my practice performance.	1	2	3	4	5
3.	During practice I visualize successful past performance.	1	2	3	4	5
4.	My attention wanders while I am training.	1	2	3	4	5
5.	I practice using relaxation techniques at workouts.	1	2	3	4	5
6.	I practice a way to relax.	1	2	3	4	5

7.	During competition I set specific result goals for myself.	1	2	3	4	5
8.	When the pressure is on at competitions, I know how to relax.	1	2	3	4	5
9.	My self-talk during competition is negative.	1	2	3	4	5
10.	During practice, I don't think about performing much – I just let it happen.	1	2	3	4	5
11.	I perform at competitions without consciously thinking about it.	1	2	3	4	5
12.	I rehearse my performance in my mind before practice.	1	2	3	4	5
13.	I can raise my energy level at competitions when necessary.	1	2	3	4	5
14.	During competition I have thoughts of failure.	1	2	3	4	5
15.	I use practice time to work on my relaxation technique.	1	2	3	4	5
16.	I manage my self-talk effectively during practice.	1	2	3	4	5
17.	I am able to relax if I get too nervous at a competition.	1	2	3	4	5
18.	I visualize my competition going exactly the way I want it to go.	1	2	3	4	5
19.	I am able to control distracting thoughts when I am training.	1	2	3	4	5
20.	I get frustrated and emotionally upset when practice does not go well.	1	2	3	4	5
21.	I have specific cue words or phrases that I say to myself to help my performance during competition.	1	2	3	4	5
22.	I evaluate whether I achieve my competition goals.	1	2	3	4	5
23.	During practice, my movements and skills just seem to flow naturally from one to another.	1	2	3	4	5
24.	When I make a mistake in competition, I have trouble getting my concentration back on track.	1	2	3	4	5
25.	When I need to, I can relax myself at competitions to get ready to perform.	1	2	3	4	5
26.	I set very specific goals for competition.	1	2	3	4	5
27.	I relax myself at practice to get ready.	1	2	3	4	5
28.	I psych myself up at competitions to get ready to perform.	1	2	3	4	5
29.	At practice, I can allow the whole skill or movement to happen naturally without concentrating on each part of the skill.	1	2	3	4	5
30.	During competition I perform on “automatic pilot”.	1	2	3	4	5
31.	When something upsets me during a competition, my performance suffers.	1	2	3	4	5
32.	I keep my thoughts positive during competitions.	1	2	3	4	5
33.	I say things to myself to help my competitive performance.	1	2	3	4	5
34.	At competitions, I rehearse the feel of my performance in my imagination.	1	2	3	4	5
35.	I practice a way to energize myself.	1	2	3	4	5
36.	I manage my self-talk effectively during competition.	1	2	3	4	5
37.	I set goals to help me use practice time effectively.	1	2	3	4	5

38.	I have trouble energizing myself if I feel sluggish during practice.	1	2	3	4	5
39.	When things are going poorly in practice, I stay in control of myself emotionally.	1	2	3	4	5
40.	I do what needs to be done to get psyched up for competitions.	1	2	3	4	5
41.	During competition, I don't think about performing much – I just let it happen.	1	2	3	4	5
42.	At practice, when I visualize my performance, I imagine what it will feel like.	1	2	3	4	5
43.	I find it difficult to relax when I am too tense at competitions.	1	2	3	4	5
44.	I have difficulty increasing my energy level during workouts.	1	2	3	4	5
45.	During practice I focus my attention effectively.	1	2	3	4	5
46.	I set personal performance goals for a competition.	1	2	3	4	5
47.	I motivate myself to train through positive self-talk.	1	2	3	4	5
48.	During practice sessions I just seem to be in a flow.	1	2	3	4	5
49.	I practice energizing myself during training sessions.	1	2	3	4	5
50.	I have trouble maintaining my concentration during long practices.	1	2	3	4	5
51.	I talk positively to myself to get the most out of practice.	1	2	3	4	5
52.	I can increase my energy to just the right level for competitions.	1	2	3	4	5
53.	I have very specific goals for practice.	1	2	3	4	5
54.	During competition, I play/perform instinctively with little conscious effort.	1	2	3	4	5
55.	I imagine my competitive routine before I do it at a competition.	1	2	3	4	5
56.	I imagine screwing up during competition.	1	2	3	4	5
57.	I talk positively to myself to get the most out of competitions.	1	2	3	4	5
58.	I don't set goals for practices, I just go out and do it.	1	2	3	4	5
59.	I rehearse my performance in my mind at competitions.	1	2	3	4	5
60.	I have trouble controlling my emotions when things are not going well at practice.	1	2	3	4	5
61.	When I perform poorly in practice I lose my focus.	1	2	3	4	5
62.	My emotions keep me from performing my best at competitions.	1	2	3	4	5
63.	My emotions get out of control under the pressure of competition.	1	2	3	4	5
64.	At practice, when I visualize my performance, I imagine watching myself as if on a video replay.	1	2	3	4	5

Appendix E

Check List Concerning Use of Sport Psychology Strategies

Read the definitions of the following terms, then answer the questions that follow:

Negative Thinking – This term reflects how one handles negative emotions, thoughts, and behaviors as they are related to one's athletic performance.

Attentional Control – Attentional control or concentration is the focusing of attention upon an immediate task. It is also a learned skill that emphasizes not reacting to or not being distracted by unimportant internal or external stimuli.

Goal Setting – A technique in which an individual or group attempts to reach a specific standard of proficiency on a task, usually within a specific time limit.

Imagery Training – Exercises that use all senses to create images that approximate physical movements in order to prepare for actual physical practice or performance.

Relaxation – Arousal management techniques used to achieve decreased stress and or anxiety.

Activation – Arousal management techniques used to achieve a feeling of greater energy and excitement.

Self-Talk – Cognitive technique used to build confidence and enhance performance through the use of personal, cognitive dialogue.

Emotional Control – This strategy is seen as a skill of coping with one's emotions or affect so that it does not interfere with one's performance.

Automaticity – This construct reflects a person's ability to perform at a high standard without thinking about what one is doing. "Being in the zone."

Which of the following strategies did you use during rehabilitation? Check Yes or No

	Yes	No
Negative Thinking	_____	_____
Attentional Control	_____	_____
Goal Setting	_____	_____
Imagery Training	_____	_____
Relaxation	_____	_____
Activation	_____	_____
Self-Talk	_____	_____
Emotional Control	_____	_____
Automaticity	_____	_____

Which of the following strategies did you use for competition? Check Yes or No

	Yes	No
Negative Thinking	_____	_____
Attentional Control	_____	_____
Goal Setting	_____	_____
Imagery Training	_____	_____
Relaxation	_____	_____
Activation	_____	_____
Self-Talk	_____	_____
Emotional Control	_____	_____
Automaticity	_____	_____

Which of the following strategies did you use receive formal training in (such as in a class or workshop)? Check Yes or No

	Yes	No
Negative Thinking	_____	_____
Attentional Control	_____	_____
Goal Setting	_____	_____
Imagery Training	_____	_____
Relaxation	_____	_____
Activation	_____	_____
Self-Talk	_____	_____
Emotional Control	_____	_____
Automaticity	_____	_____

Appendix F

Web-based Battery of Surveys

WVU Athletic Injury Study

General Description:

There are two surveys to be completed. The surveys will only take about 20 to 25 minutes to complete. The first survey asks you to report how frequently you use a wide variety of psychological skills in athletic competition and practice. The second survey assesses the type of social support you received during your rehabilitation by exploring the source of support, satisfaction of support, challenge in obtaining support, and importance of receiving support. You are also asked more specific questions about how you use a variety of sport psychology skills or strategies. Please read all instructions before beginning each survey. Before beginning the surveys, please read the following Consent and Information Form and when you reach the end click the "Continue>>" button to proceed.

Opening Instructions:

Hello and welcome to WVU Athletic Injury Study.

CONSENT and INFORMATION FORM

Title: Sport Psychology Strategies, Types of Social Support, and Adherence to Injury Rehabilitation among University Student-Athletes

Introduction: I have asked to participate in this research study, which has been explained to me by my athletic trainer. This study is being conducted to fulfill the requirements for Kenneth Tubilleja's Doctoral Dissertation in the Department of Counseling Psychology at West Virginia University under the supervision of Roy Tunick, Ed.D.

Purpose of the Study: The purpose of this study is to explore what types of social support and sport psychology strategies or skills appear to be related or have an impact on adherence to athletic injury rehabilitation. The findings in this study may be used to assist the development and implementation of a program that addresses the social support and sport psychological needs of injured athletes, helping them recover more quickly so that they may successfully return to competition.

Description of Procedures: This study involves completing three brief questionnaires and a demographics section via an on-line (computer web-based) system. This will take about 15 to 20 minutes to complete. Approximately 60 participants will be entered into this study. I understand that I do not have to answer all the items and that I may withdraw my participation at any time without penalty. After reading this Consent and Information Form, if you consent to participate in this study, then you simply have to click on the "next" icon to begin the questionnaires. Completion of the on-line surveys reflects your consent to participate in this study.

Risks and Discomforts: There are no known or expected risks from participating in this study, except for possible mild frustration associated with the completion of the questionnaires and the time involved.

Alternatives: I understand that I have the alternative not to participate in this study.

Benefits: I understand that this study is not expected to be of direct benefit to me, but the knowledge gained may be of benefit to others.

Contact Person: For more information about this research, I can contact Kenneth Tubilleja at (304) 293-3807, or his supervisor, Dr. Roy Tunick also at (304) 293-3807. For information regarding my rights as a research participant, I may contact the Executive Secretary of the Institutional Review Board for the Protection of Human Services Research at (304) 293-7073.

Confidentiality: I understand that all information about me obtained as a result of my participation in this research will be kept confidential. In any publications that result from this research, neither my name nor any information from which I might be identified will be published.

Voluntary Participation: Participation in this study is voluntary. I understand that I am free to withdraw my consent to participate in this study at any time. Refusal to participate will involve no penalty. I have been informed that if I have any questions about this study that I can contact the primary researcher, Kenneth Tubilleja or his supervisor, Roy Tunick, Ed.D.

If you willingly consent to participate in this study, please continue by clicking the "Continue>>" button with your mouse.

CONTINUE >>

SURVEY SYSTEM LM

WVU Athletic Injury Study

DEMOGRAPHICS

Provide your initials and the last 4 digits of your Social Security #: (Your identity will remain confidential, but it is needed to study the relationship between the data you and others provide and the progress of injured athletes' rehabilitation. Rest assured that only the primary researcher will have access to your data.)

Age:

Male

Female

Gender:

☐☐

College or University you attend:

Sport you primarily participate in:

Race/Ethnicity (please check appropriate space):

- ☐ Black/African American
- ☐ American Indian/Native American
- ☐ Asian American
- ☐ White/Caucasian
- ☐ Latino/Hispanic American
- ☐ Pacific Islander

☐ Other:

What is your perception of how severe your injury is?

- ☐ Mild
- ☐ Moderate
- ☐ Severe

Next

SURVEY SYSTEM LM

WVU Athletic Injury Study

TOPS

TOPS: This questionnaire measures performance strategies used by athletes in various sport situations. Because individual athletes are very different in their approach to their sport, we expect the responses to be different. We want to stress, therefore, that there are no right or wrong answers. All that is required is for you to be open and honest in your responses. Each of the following items describes a specific situation that you may encounter in your training and competition. Please rate how frequently these situations apply to you on the following scale:

	Never	Rarely	Sometimes	Often	Always
I set realistic but challenging goals for practice.	☐	☐	☐	☐	☐
I say things to myself to help my practice performance.	☐	☐	☐	☐	☐
During practice I visualize successful past performance.	☐	☐	☐	☐	☐
My attention wanders while I am training.	☐	☐	☐	☐	☐
I practice using relaxation techniques at workouts.	☐	☐	☐	☐	☐
I practice a way to relax.	☐	☐	☐	☐	☐
During competition I set specific result goals for myself.	☐	☐	☐	☐	☐
When the pressure is on at competitions, I know how to relax.	☐	☐	☐	☐	☐
My self-talk during competition is negative.	☐	☐	☐	☐	☐
During practice, I don't think about performing much – I just let it happen.	☐	☐	☐	☐	☐
I perform at competitions without consciously thinking about it.	☐	☐	☐	☐	☐
I rehearse my performance in my mind before practice.	☐	☐	☐	☐	☐
I can raise my energy level at competitions when necessary.	☐	☐	☐	☐	☐
During competition I have thoughts of failure.	☐	☐	☐	☐	☐
I use practice time to work on my relaxation technique.	☐	☐	☐	☐	☐
I manage my self-talk effectively during practice.	☐	☐	☐	☐	☐

I am able to relax if I get too nervous at a competition.	☐	☐	☐	☐	☐
I visualize my competition going exactly the way I want it to go.	☐	☐	☐	☐	☐
I am able to control distracting thoughts when I am training.	☐	☐	☐	☐	☐
I get frustrated and emotionally upset when practice does not go well.	☐	☐	☐	☐	☐
I have specific cue words or phrases that I say to myself to help my performance during competition.	☐	☐	☐	☐	☐
I evaluate whether I achieve my competition goals.	☐	☐	☐	☐	☐
During practice, my movements and skills just seem to flow naturally from one to another.	☐	☐	☐	☐	☐
When I make a mistake in competition, I have trouble getting my concentration back on track.	☐	☐	☐	☐	☐
When I need to, I can relax myself at competitions to get ready to perform.	☐	☐	☐	☐	☐
I set very specific goals for competition.	☐	☐	☐	☐	☐
I relax myself at practice to get ready.	☐	☐	☐	☐	☐
I psych myself up at competitions to get ready to perform.	☐	☐	☐	☐	☐
At practice, I can allow the whole skill or movement to happen naturally without concentrating on each part of the skill.	☐	☐	☐	☐	☐
During competition I perform on “ automatic pilot” .	☐	☐	☐	☐	☐
When something upsets me during a competition, my performance suffers.	☐	☐	☐	☐	☐
I keep my thoughts positive during competitions.	☐	☐	☐	☐	☐
I say things to myself to help my competitive performance.	☐	☐	☐	☐	☐
At competitions, I rehearse the feel of my performance in my imagination.	☐	☐	☐	☐	☐
I practice a way to energize myself.	☐	☐	☐	☐	☐
I manage my self-talk effectively during competition.	☐	☐	☐	☐	☐
I set goals to help me use practice time effectively.	☐	☐	☐	☐	☐
I have trouble energizing myself if I feel sluggish during practice.	☐	☐	☐	☐	☐
When things are going poorly in practice, I stay in control of myself emotionally.	☐	☐	☐	☐	☐

I do what needs to be done to get psyched up for competitions.	☐	☐	☐	☐	☐
During competition, I don't think about performing much – I just let it happen.	☐	☐	☐	☐	☐
At practice, when I visualize my performance, I imagine what it will feel like.	☐	☐	☐	☐	☐
I find it difficult to relax when I am too tense at competitions.	☐	☐	☐	☐	☐
I have difficulty increasing my energy level during workouts.	☐	☐	☐	☐	☐
During practice I focus my attention effectively.	☐	☐	☐	☐	☐
I set personal performance goals for a competition.	☐	☐	☐	☐	☐
I motivate myself to train through positive self-talk.	☐	☐	☐	☐	☐
During practice sessions I just seem to be in a flow.	☐	☐	☐	☐	☐
I practice energizing myself during training sessions.	☐	☐	☐	☐	☐
I have trouble maintaining my concentration during long practices.	☐	☐	☐	☐	☐
I talk positively to myself to get the most out of practice.	☐	☐	☐	☐	☐
I can increase my energy to just the right level for competitions.	☐	☐	☐	☐	☐
I have very specific goals for practice.	☐	☐	☐	☐	☐
During competition, I play/perform instinctively with little Conscious effort.	☐	☐	☐	☐	☐
I imagine my competitive routine before I do it at a competition.	☐	☐	☐	☐	☐
I imagine screwing up during competition.	☐	☐	☐	☐	☐
I talk positively to myself to get the most out of competitions.	☐	☐	☐	☐	☐
I don't set goals for practices, I just go out and do it.	☐	☐	☐	☐	☐
I rehearse my performance in my mind at competitions.	☐	☐	☐	☐	☐
I have trouble controlling my emotions when things are not going well at practice.	☐	☐	☐	☐	☐
When I perform poorly in practice I lose my focus.	☐	☐	☐	☐	☐
My emotions keep me from performing my best at competitions.	☐	☐	☐	☐	☐
My emotions get out of control under the pressure of competition.	☐	☐	☐	☐	☐
At practice, when I visualize my performance, I imagine watching myself as if on a video replay.	☐	☐	☐	☐	☐

Previous

Next

SURVEY SYSTEM LM

WVU Athletic Injury Study

SSS – CF

The following questions focus on individuals in your environment who provide you with help and/or support. Read the definition of the type of support being considered and respond to the questions that follow it. Please answer all the questions as best you can – there are no right or wrong answers. (Remember, these questions are based on how you felt during your rehabilitation). All your responses are strictly confidential.

LISTENING SUPPORT: People who listen to you without giving advice or being judgmental.

Write the initials of all the individuals who provide you with listening support. If no one provides you with this support, please indicate “no one.” After each person, indicate the relationship you have with her or him (for example, friend, co-worker, spouse, parent, brother, sister, coach, teammate, athletic trainer). Example: Initials: K.T. Relationship: grandmother. So, you would write KT-grandmother

Very Dissatisfied Very Satisfied

In general, how satisfied are you with the overall quality of listening support you receive?

☐ ☐ ☐ ☐ ☐

Very Difficult Very Easy

How difficult would it be for you to obtain more listening support?

☐ ☐ ☐ ☐ ☐

Very
Unimportant Very Important

How important for your overall well-being is it to have one or more persons provide you with listening support?

☐ ☐ ☐ ☐ ☐

TASK APPRECIATION: People who acknowledge your efforts and express appreciation for the work you do.

Write the initials of all the individuals who provide you with task appreciation. If no one provides you with this support, please indicate “ no one.” After each person, indicate the relationship you have with her or him (for example, friend, co-worker, spouse, parent, brother, or sister).

Very Dissatisfied Very Satisfied

In general, how satisfied are you with the overall quality of task appreciation you receive?

☐ ☐ ☐ ☐ ☐

Very Difficult Very Easy

How difficult would it be for you to obtain more task appreciation?

☐ ☐ ☐ ☐ ☐

Very
Unimportant Very Important

How important for your overall well-being is it to have one or more persons provide you with task appreciation?

☐ ☐ ☐ ☐ ☐

TASK CHALLENGE: People who challenge your way of thinking about your work or activity in order to stretch you, motivate you, and lead you to greater creativity, excitement, and involvement in your work or activity.

Write the initials of all the individuals who provide you with task challenge. If no one provides you with this support, please indicate “no one.” After each person, indicate the relationship you have with her or him (for example, friend, co-worker, spouse, parent, brother, or sister).

Very Dissatisfied Very Satisfied

In general, how satisfied are you with the overall quality of task challenge you receive?

☐ ☐ ☐ ☐ ☐

Very Difficult Very Easy

How difficult would it be for you to obtain more task challenge?

☐ ☐ ☐ ☐ ☐

Very
Unimportant Very Important

How important for your overall well-being is it to have one or more persons provide you with task challenge?

☐ ☐ ☐ ☐ ☐

EMOTIONAL SUPPORT: People who comfort you and indicate to you that they are on your side and care for you.

Write the initials of all the individuals who provide you with emotional support. If no one provides you with this support, please indicate “no one.” After each person, indicate the relationship you have with her or him (for example, friend, co-worker, spouse, parent, brother, or sister).

Very Dissatisfied Very Satisfied

In general, how satisfied are you with the overall quality of emotional support you receive?

☐ ☐ ☐ ☐ ☐

Very Difficult Very Easy

How difficult would it be for you to obtain more emotional support?

☐ ☐ ☐ ☐ ☐

Very
Unimportant Very Important

How important for your overall well-being is it to have one or more persons provide you with emotional support?

☐ ☐ ☐ ☐ ☐

EMOTIONAL CHALLENGE: People who challenge you to evaluate your attitudes, values, and feelings.

Write the initials of all the individuals who provide you with emotional challenge. If no one provides you with this support, please indicate “no one.” After each person, indicate the relationship you have with her or him (for example, friend, co-worker, spouse, parent, brother, or sister).

Very Dissatisfied Very Satisfied

In general, how satisfied are you with the overall quality of emotional challenge you receive?

☐ ☐ ☐ ☐ ☐

Very Difficult Very Easy

How difficult would it be for you to obtain more emotional challenge?

☐ ☐ ☐ ☐ ☐

Very
Unimportant Very Important

How important for your overall well-being is it to have one or more persons provide you with emotional challenge?

☐ ☐ ☐ ☐ ☐

REALITY CONFIRMATION: People who are similar to you – see things the way you do – who help you confirm your perceptions and perspectives of the world and help you keep things in focus.

Write the initials of all the individuals who provide you with reality confirmation. If no one provides you with this support, please indicate “ no one.” After each person, indicate the relationship you have with her or him (for example, friend, co-worker, spouse, parent, brother, or sister).

.. Very Satisfied

In general, how satisfied are you with the overall quality of reality confirmation you receive?

☐ ☐ ☐ ☐ ☐

Very Difficult Very Easy

How difficult would it be for you to obtain more reality confirmation?

☐ ☐ ☐ ☐ ☐

Very
Unimportant Very Important

How important for your overall well-being is it to have one or more persons provide you with reality confirmation?

☐ ☐ ☐ ☐ ☐

TANGIBLE ASSISTANCE: People who provide you with either financial assistance, products, and/or gifts.

Write the initials of all the individuals who provide you with tangible assistance. If no one provides you with this support, please indicate "no one." After each person, indicate the relationship you have with her or him (for example, friend, co-worker, spouse, parent, brother, or sister).

Very Dissatisfied Very Satisfied

In general, how satisfied are you with the overall quality of tangible assistance you receive?

☐ ☐ ☐ ☐ ☐

Very Difficult Very Easy

How difficult would it be for you to obtain more tangible assistance?

☐ ☐ ☐ ☐ ☐

Very
Unimportant Very Important

How important for your overall well-being is it to have one or more persons provide you with tangible assistance?

☐ ☐ ☐ ☐ ☐

PERSONAL ASSISTANCE: People who provide you with services or help, such as running an errand for you or driving you somewhere.

Write the initials of all the individuals who provide you with personal assistance. If no one provides you with this support, please indicate “ no one.” After each person, indicate the relationship you have with her or him (for example, friend, co-worker, spouse, parent, brother, or sister).

Very Dissatisfied Very Satisfied

In general, how satisfied are you with the overall quality of personal assistance you receive?

☐ ☐ ☐ ☐ ☐

Very Difficult Very Easy

How difficult would it be for you to obtain more personal assistance?

☐ ☐ ☐ ☐ ☐

Very
Unimportant Very Important

How important for your overall well-being is it to have one or more persons provide you with personal assistance?

☐ ☐ ☐ ☐ ☐

Previous

Next

SURVEY SYSTEM

WVU Athletic Injury Study

CL-SPS

Read the definitions of the following terms, then answer the questions that follow:

NEGATIVE THINKING – This term reflects how one handles negative emotions, thoughts, and behaviors as they are related to one's athletic performance.

ATTENTIONAL CONTROL – Attentional control or concentration is the focusing of attention upon an immediate task. It is also a learned skill that emphasizes not reacting to or not being distracted by unimportant internal or external stimuli.

GOAL SETTING – A technique in which an individual or group attempts to reach a specific standard of proficiency on a task, usually within a specific time limit.

IMAGERY TRAINING – Exercises that use all senses to create images that approximate physical movements in order to prepare for actual physical practice or performance.

RELAXATION – Arousal management techniques used to achieve decreased stress and or anxiety.

ACTIVATION – Arousal management techniques used to achieve a feeling of greater energy and excitement.

SELF-TALK – Cognitive technique used to build confidence and enhance performance through the use of personal, cognitive dialogue.

EMOTIONAL CONTROL – This strategy is seen as a skill of coping with one's emotions or affect so that it does not interfere with one's performance.

AUTOMATICITY – This construct reflects a person's ability to perform at a high standard without thinking about what one is doing. "Being in the zone."

Which of the following strategies did you use during rehabilitation? Check Yes or No

	Yes	No
Negative Thinking	☐	☐
Attentional Control	☐	☐
Goal Setting	☐	☐
Imagery Training	☐	☐
Relaxation	☐	☐

Activation	☐	☐
Self-Talk	☐	☐
Emotional Control	☐	☐
Automaticity	☐	☐

Which of the following strategies did you use for competition? Check Yes or No

	Yes	No
Negative Thinking	☐	☐
Attentional Control	☐	☐
Goal Setting	☐	☐
Imagery Training	☐	☐
Relaxation	☐	☐
Activation	☐	☐
Self-Talk	☐	☐
Emotional Control	☐	☐
Automaticity	☐	☐

Which of the following strategies did you use receive formal training in (such as in a class or workshop)? Check Yes or No

	Yes	No
Negative Thinking	☐	☐
Attentional Control	☐	☐
Goal Setting	☐	☐
Imagery Training	☐	☐
Relaxation	☐	☐
Activation	☐	☐
Self-Talk	☐	☐
Emotional Control	☐	☐
Automaticity	☐	☐

Previous

Submit

SURVEY SYSTEM

WVU Athletic Injury Study

THANK YOU

Your participation in this survey is very much appreciated and it will help us develop rehabilitation treatment programs that will assist future student-athletes in their injury recovery. If you have any questions please feel free to contact the primary researcher, Kenneth Tubilleja, M.S. at (304) 293-3807 or at ktubille@mix.wvu.edu. You may also contact my supervisor, Dr. Roy at (304) 293-3807.

Appendix G

Consent and Information Sheet

CONSENT and INFORMATION FORM

Title: Sport Psychology Strategies, Types of Social Support, and Adherence to Injury Rehabilitation among University Student-Athletes

Introduction: I have asked to participate in this research study, which has been explained to me by my athletic trainer. This study is being conducted to fulfill the requirements for Kenneth Tubilleja's Doctoral Dissertation in the Department of Counseling Psychology at West Virginia University under the supervision of Roy Tunick, Ed.D.

Purpose of the Study: The purpose of this study is to explore what types of social support and sport psychology strategies or skills appear to be related or have an impact on adherence to athletic injury rehabilitation. The findings in this study may be used to assist the development and implementation of a program that addresses the social support and sport psychological needs of injured athletes, helping them recover more quickly so that they may successfully return to competition.

Description of Procedures: This study involves completing three brief questionnaires and a demographics section via an on-line (computer web-based) system. This will take about 15 to 20 minutes to complete. Approximately 60 participants will be entered into this study. I understand that I do not have to answer all the items and that I may withdraw my participation at any time without penalty. After reading this Consent and Information Form, if you consent to participate in this study, then you simply have to click on the "next" icon to begin the questionnaires. Completion of the on-line surveys reflects your consent to participate in this study.

Risks and Discomforts: There are no known or expected risks from participating in this study, except for possible mild frustration associated with the completion of the questionnaires and the time involved.

Alternatives: I understand that I have the alternative not to participate in this study.

Benefits: I understand that this study is not expected to be of direct benefit to me, but the knowledge gained may be of benefit to others.

Contact Person: For more information about this research, I can contact Kenneth Tubilleja at (304) 293-3807, or his supervisor, Dr. Roy Tunick also at (304) 293-3807. For information regarding my rights as a research participant, I may contact the Executive Secretary of the Institutional Review Board for the Protection of Human Services Research at (304) 293-7073.

Confidentiality: I understand that all information about me obtained as a result of my participation in this research will be kept confidential. In any publications that result from this research, neither my name nor any information from which I might be identified will be published.

Voluntary Participation: Participation in this study is voluntary. I understand that I am free to withdraw my consent to participate in this study at any time. Refusal to participate will involve no penalty. I have been informed that if I have any questions about this study that I can contact the primary researcher, Kenneth Tubilleja or his supervisor, Roy Tunick, Ed.D.

If you willingly consent to participate in this study, please continue by clicking the "Continue>>" button with your mouse.

Kenneth Tubilleja, M.S.,
Primary Investigator

Appendix H

Internal Review Board Letters of Approval

University Research Compliance Office
1 Fairchild Hall
Manhattan, KS 66506 -1107 785-532-3224
Fax: 785-532-3235
<http://www.ksu.edu/research/>
Proposal Number: 2531

TO: Fred Newton
Counseling Services
Lefene

FROM: Rick Scheidt, Chair
Committee on Research Involving Human Subjects

DATE: May 16, 2002

Approval of Proposal Entitled, "Sport psychology strategies, types of social support, and adherence to injury rehabilitation among university student-athletes."

The Committee on Research Involving Human Subjects has reviewed your proposal and has granted full approval.

In giving its approval, the Committee has determined that:

- ☒ There is no more than minimal risk to the subjects.
There is greater than minimal risk to the subjects.

This approval applies only to the proposal currently on file. Any change affecting human subjects must be approved by the Committee prior to implementation. All approved proposals are subject to continuing review at least annually, which may include the examination of records connected with the project. Injuries or any unanticipated problems involving risk to subjects or to others must be reported immediately to the Chair of the Committee on Research involving Human Subjects, the University Research Compliance Office, and if the subjects are KSU students, to the Director of the Student Health Center.

Prior to involving human subjects, properly executed informed consent must be obtained from each subject or from an authorized representative, and documentation of informed consent must be kept on file for at least three years after the project ends. Each subject must be furnished with a copy of the informed consent document for his or her personal records. The identification of particular human subjects in any publication is an invasion of privacy and requires a separately executed informed consent.

It is important that your human subjects project is consistent with submissions to funding/contract entities. It is your responsibility to initiate notification procedures to any funding/contract entity of any changes in your project that affects the use of human subjects.

California University of Pennsylvania

Proposal Number

02-02/

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PROTOCOL for Research Involving Human Subjects

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OFFICE OF GRANTS AND CONTRACTS

Institutional Review Board (IRB) approval is required before beginning any research and/or data collection involving human subjects

Request for Exempt Review

Request for Expedited Review

Request for Full Board Review

(Reference **IRB** Policies and Procedures for clarification)

Project Title Sport Psychology Strategies, Types of Social Support, and Adherence to Injury Rehabilitation among University Student-Athletes

Researcher/Project Director Kenneth Tubilleja, M.S., Doctoral Candidate

Phone # (304) 293-3807

E-mail Address ktubille@hotmail.com

Faculty Sponsor (if you are a student) Roy Tunick, Ed.D., Professor, Coll. of HR&E, Dept. of Counseling Psychology, West Virginia University
Department Counseling Psychology (WVU)

Project Dates 11/01/2002 to 03/01/2003

Sponsoring Agent (if applicable) _____

Project to be Conducted at _____

Purpose of the Project

☐ Thesis

☐ Class Project

☐ Research

☒ Other :Dissertation

Required IRB Training

The training requirement can be satisfied by completing the online training session at <http://cme.nci.nih.gov/>. A copy of your certification of training must be attached to this IRB Protocol. If you have completed the training at an earlier date and have already provided documentation to the California University of Pennsylvania Grants Office, please provide the following:

Previous Project Title _____

Date of Previous IRB Protocol _____

(All Proposals Must be Typed)

1. Give a brief overview of your project/proposal with research hypothesis. **Please see Appendix.**

2. Give a brief description of the subjects you plan to use, and check the appropriate box(es) below.
Please see Appendix.

☒ Adult Volunteers	☐ Mentally Ill
☐ Minor Volunteers	☐ Elderly
☐ Children Under 18	☐ Mentally Retarded
☒ CAL University Students	☐ Physically Handicapped
☐ Minorities	☐ Prisoners
☐ Disadvantaged	☐ Pregnant Women

3. **Is remuneration involved in your project?** D Yes or 8:] No **If yes, Explain below.**
4. How do you plan to select subjects? Did they volunteer? Is participation required?
Explain below.
Please see Appendix.
5. Does your project involve use of a consent form? D Yes or KJ No Please see Appendix If yes, attach the form.
What instruments or devices will be used to gather data? Provide a copy of documentation pertaining to the data collection, such as but not limited to:
6. Cover letter, questionnaire/survey, consent form, interview/focus group sheets.

Is this project part of a grant? D Yes or ~ No

If yes, provide the following information:

Title of the Grant Proposal

Name of the Funding Agency

Dates of the Project Period

8. Does your project involve the debriefing of those who participated? If yes, ~ Yes or D No
explain the debriefing procedure.
Please see Appendix for explanation.

9. The Federal Regulations require that the protocol meet certain criteria before IRE approval can be obtained.
Describe in detail how the following requirements will be satisfied:

- A. Insure that the risks of the subject are minimized.
- B. Justify the degree of risk involved (if any) in relationship to the potential of the project to the subject matter .
- C. Insure that the selection of the subjects is equitable.
- D. Guarantee that informed consent will be obtained for each prospective subject or the subject's legally authorized representative and that consent forms will be adequately documented.
- E. Monitor the data collected to ensure the safety of the subject.
- F. Protect the privacy of subjects and maintain the confidentiality of data.
- G. Provide for extra safeguards to protect the rights and welfare of "vulnerable" subjects (e.g., children, prisoners, pregnant women, mentally disabled persons or economically or educationally disadvantaged persons).

Project Director's Certification Program Involving
HUMAN SUBJECTS

The proposed investigation (*research or training program*) involves the use of human subjects and I am submitting the complete application form and description of the project to the Institutional Review Board for Research Involving Human Subjects.

If the Board grants approval of this application, I agree to:

1. Abide by any conditions or changes in the project required by the Board.
2. Report to the Board any change in the research plan that affects the method of using human subjects before such change is instituted.
3. Report to the Board any problems that arise in connection with the use of human subjects.
4. Seek advice of the Board whenever I believe such advice is necessary would be helpful.
5. Secure the informed, written consent of all human subjects participating in the project.
6. Cooperate with the Board designed in its effort to provide a continuing review after investigations have been initiated.

I have reviewed the Federal and State regulations concerning the use of human subjects in research and training programs and the guidelines. I agree to abide by the regulations and guidelines aforementioned and will adhere to policies and procedures described in my application. I understand that changes to the research must be approved by the IRB before they are implemented.

Professional Research

Signature of Project Director

Signature of Department Chairperson

Student Research

Signature of Student Researcher

ACTION OF REVIEW BOARD

The Institutional Review Board for Research Involving Human Subjects has reviewed this application to ascertain whether or not the proposed project:

1. provides adequate safeguards of the rights and welfare of human subjects involved in the investigations;
2. uses appropriate methods to obtain informed, written consent;
3. indicates that the potential benefits of the investigation substantially outweigh the risk involved.
4. provides adequate debriefing of human participants.
5. provides adequate follow-up services to participants who may have incurred physical, mental, or emotional

BOARD DISPOSITION

Chairperson, Institutional Review Board

November 18, 2002

Kenneth Tubilleja
Department of Counseling
Psychology West Virginia University
P.O. Box 6122
Morgantown, WV 26506-6122

Dear Mr. Tubilleja:

I am pleased to inform you that the Research Review Board of West Virginia Wesleyan College has approved your proposal, "Sport psychology strategies, types of social support, and adherence to injury rehabilitation among university student-athletes". You may begin your data collection at this time.

Please do not hesitate to contact me further at johnson-d@wwvc.edu or (304) 473-8044 if you require additional information or if you change your research protocols.

Best wishes for a successful research experience.

Sincerely,

Danette I. Johnson, Ph.D. Chair,
Research Review Board

BUCKHANNON
WEST VIRGINIA
26201

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304-473-8000