

Running head: MINDFULNESS, ANXIETY, AND SPORT INJURY

THE RELATIONSHIP BETWEEN MINDFULNESS, ANXIETY, AND TIME LOST IN
SPORT DUE TO INJURY AMONG COLLEGIATE ATHLETES

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Abstract

As an athlete, acquiring an injury is one of the leading factors impeding performance, and studies show anxiety to be a predictor of sport injury occurrence. Mindfulness is becoming increasingly popular in Western psychology and has been linked, not only to decreased anxiety, but to increased overall health, as well as higher levels of performance among athletes. However, there has been very little examination of the relationship between mindfulness and sport injury occurrence among athletes. The purpose of this study was to examine the relationships between mindfulness, anxiety, and sports injury occurrence among collegiate athletes and to evaluate the following three hypotheses: (a) athletes reporting lower overall mindfulness would report more time lost playing because of injury; (b) athletes who reported higher levels of anxiety would experience more time lost playing because of injury; (c) athletes who reported higher levels of mindfulness would report lower levels of anxiety. The results of this study showed no evidence of a relationship between mindfulness and time loss due to injury among collegiate athletes. Total anxiety in all athletes did not show a significant relationship with sports absence because of injuries. However, somatic anxiety and worry alone were shown to have a very strong positive relationship with sport absence due to injury. This study showed no strong evidence of a relationship between total mindfulness and total anxiety among collegiate athletes. However, exploratory findings included the discovery that athletes who reported mindful nonreacting and observing also reported much less anxiety. Implications of these findings are discussed along with recommendations for sport performance stake holders and future researchers.

Keywords: mindfulness, sport psychology, anxiety, performance, injury

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Chapter One

Literature Overview

An athlete's ability to perform at his or her highest level depends upon a multitude of factors that are both in and out of the athlete's control. Professionals working within the arena of sports psychology strive to intimately understand these factors to provide athletes with the tools needed to navigate success. As an athlete, acquiring an injury is one of the leading factors impeding performance. Naturally then, sport performance consultants have a personal stake in employing interventions that not only benefit the performance of the athlete but also help with injury prevention.

For the past 30 years, the primary psychological approach for enhancing performance has been strategies and techniques evolving out of the cognitive-behavioral tradition (Weinberg & Gould, 2007; Whelan, Mahoney, & Meyers, 1991). Most notable among these techniques is psychological skills training (PST), a field that took shape with the help of Meichenbaum (1977) and Bandura (1977). Most of the techniques in PST prioritize the self-control of internal states like physical sensations, thoughts, and emotions. However, newer strategies have begun to emerge out of an ever-growing branch of psychology labeled mindfulness, and interventions such as the mindfulness acceptance and commitment (MAC) approach to sports performance. These relatively new techniques appear to show promising signs for helping athletes not only perform better but also help them cope more effectively with the aversive internal state of anxiety, which has been shown to be causally connected to injury occurrence (Johnson, 2007). Therefore, the following literature review will begin by examining mindfulness, its benefits inside the sports arena, how it functions compared to traditional sports

psychology interventions, and will end by inquiring into the relationship mindfulness may have with injury occurrence in competitive sports.

Defining mindfulness. Mindfulness is becoming increasingly popular in Western psychology. It is defined by Kabat-Zinn (2003) as "...paying attention in a particular way, on purpose, in the present moment and non-judgmentally to the unfolding of experience moment by moment" (p. 145). Its growing popularity is further indicated by the numerous studies that have been undertaken in the last twenty years, empirical studies examining the benefits of mindfulness as clinical interventions in many fields of medicine (Keng, Smoksi, & Robins, 2011). Mindfulness as a concept originally came out of contemplative traditions such as mystic Christianity and Buddhism, where conscious attention and awareness is actively cultivated (King, 2010). It is well understood that attention and awareness are normal aspects of regular functioning and consciousness. Mindfulness can be a more intentional and enhanced way of paying attention to and being aware of present moment experiences (Brown & Ryan, 2003). Possibly the most popular definition for mindfulness comes from Kabat-Zinn (2005) who explained it to be "an open-hearted, moment-to-moment nonjudgmental awareness" (p. 24). Because of the amount of attention mindfulness has received over the last 15 years from researchers, it is steadily becoming a mainstream construct in psychotherapy (Davis & Hayes, 2011).

Mindfulness and mental health. What are the empirically supported benefits of mindfulness? There is existing data showing that mindfulness has an impact in many areas of human functioning. Davis and Hayes (2011) explored what mindfulness research has yielded throughout the last decade or so. Among the studies examined,

Chambers, Lo, and Allen (2008) revealed that participants who took part in a 10-day mindfulness meditation intensive exhibited not only higher mindfulness scores but also reported decreased negative affect, fewer depressive symptoms, less rumination, and a significantly better working memory that allowed for longer periods of sustained attention while performing tasks.

Other studies show mindfulness can benefit working memory and protect against functional impairments in high-stress situations (Jha, Stanley, Kiyonaga, Wong, & Gelfand, 2010), decrease emotional reactivity (Ortner, Kilner, & Zelazo, 2007), increase cognitive flexibility (Shapiro, Schwartz, & Bonner, 1998), help therapists develop empathy towards clients (Aiken, 2006; Wang, 2007), cultivate compassion (Shapiro, Astin, Bishop, & Cordova, 2005; Shapiro, Brown, & Biegel, 2007), increase counseling skills (Newsom, Christopher, Dahlen, & Christopher, 2006; Schure, Christopher, & Christopher, 2008), increase overall wellness (Rybak & Russell-Chapin, 1998), and create a better quality of life (Bruce, Young, Turner, Vander Wal, & Linden, 2002).

Other data indicate that benefits of mindfulness are associated not only with decreased negative symptoms such as anxiety and depression but also with physical changes in the brain. Functional magnetic resonance imaging (fMRI) has revealed specifically what occurs in the brain of an individual practicing mindfulness. A study conducted by Farb et al. (2010) measured the neural reactivity by fMRI of individuals watching sad films. The participants who were randomly chosen to attend a mindfulness-based stress reduction (MBSR) course not only showed significantly less anxiety, depression, and somatic distress compared to the control group but also displayed less neural reactivity when exposed to the sad films and much different neural responses than

they did before taking the course. Specifically, while the MSBR group reported the same dysphoria to the films as the control group, they also reported significantly less anxiety than the control group. Moreover, the MSBR group showed less neural reactivity in areas of the brain connected to increased self-focus and ruminative problem solving (less emotional reactivity) and displayed increased activity in areas of the brain connected to body sensation, which was associated with decreased depression scores. Researchers concluded that mindfulness may change the way the brain processes negative emotions by seeing them as more objective, innocuous sensory information rather than a threat, which in turn reduced dysphoric reactivity.

Findings like these led researchers to believe that mindfulness may allow people to enhance their emotion regulation strategies by helping them experience emotions selectively and that the experiencing of these emotions after practicing mindfulness meditation may be processed differently inside the brain (Williams, 2010). Concerning emotional affect, a study by Davidson et al. (2003) has suggested that mindfulness interventions increase activity in the anterior region of the left hemisphere, which relates to a pleasant affect. Davidson (2002) also used fMRI imaging to examine Buddhist monks with over 40,000 hours of mindfulness meditation experience. Evidence from this study showed that mindfulness meditation changes brain structures and functions and can aid in neuroplasticity (i.e., restructuring/rewiring in the brain that happens because of experience). Another study by Brefczynski-Lewis, Lutz, Schaefer, Levinson, and Davidson (2007) has shown how activity centers in the brain involved with attention respond in those who are experienced in mindfulness. They found that experts in meditation did not require as much cognitive activation to stay focused on the task at

hand and therefore had more cognitive resources available for use.

Because of the impact anxiety has on performance, the various studies that show mindfulness to reduce stress and anxiety will now be discussed. MBSR is one of the most popular mindfulness programs in existence. It is a mode of mindfulness training that has received the most empirical study and typically consists of an eight-week long course where participants are taught simple mindfulness meditation, attend group classes, and engage in daily home practice (Kabat-Zinn, 2003). Kabat-Zinn et al. (1992), one of the pioneers in researching the effectiveness of mindfulness in people with anxiety disorders, found MBSR to effectively reduce symptoms of panic and anxiety in a group of 22 participants. Similarly, in conducting a meta-analysis of 39 studies that examined MBSR, researchers concluded that it might be beneficial in helping to alter affective and cognitive processes (e.g., anxiety) that are behind many clinical mental health problems (Hoffman, Sawyer, Witt, & Oh, 2010). Another study comparing the effects of aerobic exercise to those of MBSR in participants with social anxiety disorder found MBSR to be more efficacious for reducing anxiety and increasing positive self-view and the ability of an individual with social anxiety disorder to develop a more adaptive self-referencing process in social situations (Goldin, Ziv, Jazaieri, Hahn, & Gross, 2012).

In recent years, newer strategies have developed that focus on the benefits of mindfulness techniques for enhancing performance. As sports performers are required to achieve quick results in fast-paced environments, it appears crucial that the maximum amount of task-oriented attention be available to an athlete at any given moment during competitive play. It is apparent that mindfulness appears to have substantial benefits for those who practice it. However, what benefit does it have on athletic performance?

Before examining the function of mindfulness and how it differs from traditional techniques in sports psychology, a brief review of how mindfulness has been shown in the literature to benefit athletes will be carried out.

Mindfulness and peak performance. Mindfulness appears to be a key component for allowing an athlete to cope with anxiety in a way that still allows them to still give full attention to the task at hand. Davidson (2002) suggests that mindfulness practitioners appear to be like “mental athletes” who— through consistent practice— can increase their ability to respond effectively to emotional and cognitive processes such as anxiety. Considering what data have shown regarding how mindfulness may be able to assist with achieving and maintaining mental health, it is not surprising that researchers are also discovering information that suggests mindfulness to be helpful in areas of peak sports performance. As found in the aforementioned study (Brefczynski-Lewis et al., 2007), mindfulness has been shown to free up cognitive functioning. When more cognitive functioning is available it allows for more resources to be available when needed, such as in competitive sport, where multitasking is crucial. These results appear to extend to real-world performance situations as well as the medical laboratory, as research examining the impact mindfulness has on sports performers has yielded similarly promising results.

The first study involving mindfulness in sport was in 1985, conducted by Kabat-Zinn, Beall, and Rippe. They studied the impact of mindfulness training on Olympic and collegiate rowers and found that some of the Olympic rowers reported mindfulness positively contributed to their performance. Since then, researchers have shown growing interest in the relationship between mindfulness and optimal sports performance. While

investigating the relationship between mindfulness, pre-shot routine, and basketball free throw percentage, researchers found that a performer's level of mindfulness significantly predicts free throw percentage when in a basketball match (Gooding & Gardner, 2009). Researchers questioning how Division I women soccer players experienced a mindfulness meditation training for sports performance enhancement program found that participants while reporting some initial difficulty understanding the process of meditation, reported a greater ability to accept aversive emotions instead of being distracted by them. This reportedly allowed these athletes to focus on the task at hand more easily both on and off the soccer field (Baltzell, Caraballo, Chipman, & Hayden, 2014). This data shows that mindfulness may be able to predict performance outcome in some cases.

Two of the foremost researchers of mindfulness-based performance enhancement, Gardner and Moore (2012), examined the development of mindfulness techniques in sports psychology that occurred throughout the 11 years prior to their 2012 study. The authors concluded that the data accumulated so far suggest the mechanisms of change beneath mindfulness interventions may be sharper mental efficiency due to increased awareness and acceptance of internal experiences. While mindfulness-based interventions in sports performance are still relatively new, there are increasing amounts of research suggesting mindfulness to be helpful in an athlete's goal to achieve at his or her maximum potential. The processes by which this happens and how those processes differ from traditional interventions in sport performance psychology will be explored in the next section.

Traditional sport psychology. To gain a better understanding of where

interventions in sports psychology have evolved from, traditional psychological skills training (PST) procedures will now be briefly examined. The procedures examined include goal setting, imagery, arousal control, self-talk, and pre-performance routines.

Goal setting, which has been suggested to motivate individuals to become more productive and effective, refers to making short, medium, and long-range goals that focus on the performance of the individual, their outcomes, and processes that are involved in getting those outcomes (Gardner & Moore, 2007). Imagery is a procedure that encourages “using all the senses to re-create an experience in the mind” (Vealey & Greenleaf, 2001, p. 248) and is most often used to prepare a performer to execute a skill correctly. Arousal control methods (also called arousal regulation) are used to create subjective control over arousal levels on a physiological level (Gardner & Moore, 2007). Traditional self-regulation theory suggests that arousal control must be at a very high level for effective performance (Hardy, Jones, & Gould, 1996). Self-talk is based on performance models that suggest a linear relationship between thoughts, feelings, and performance. Self-talk techniques such as positive self-affirmations are used to control thoughts and emotions to enhance performance (Hardy et al., 1996). Finally, pre-performance routines are procedures used to control stimuli and are often seen in behavioral psychology. These methods include a sequence of consistent behaviors that are acted out before performance situations and can include activities like eating the same food before each event, dressing in a certain order, wearing specific clothes, or warming up in a certain way. These routines are believed to enhance attention to the task by minimizing stimuli that distract the performer, which is believed to promote optimal performance (Hardy et al., 1996).

A critique of psychological skills training. Gardner and Moore (2006) in conducting a structured review of the academic literature for supporting the use of PST procedures to enhance competitive athletic performance found that, despite claims from well-respected figures and positive anecdotal evidence and case study reports, there were insufficient data to support the efficacy of these interventions. Some authors (Hayes, Follete, & Linehan, 2004) have called into question traditional interventions and made new assertions indicating that problematic behavioral outcomes are a result of judging internal experiences as negative (Gardner & Moore, 2007).

As expected, data indicate that perceiving thoughts and emotions as negative and then suppressing and controlling these thoughts and emotions can trigger an individual to continuously scan for a return of this unwanted activity, consequently bringing it into awareness when detected, thus distracting the individual from the task at hand (Purdon, 1999; Wegner, 1994). Moreover, it has been found that efforts to control and suppress specific unwanted internal experiences may even lead to experiencing additional unwanted thoughts and emotions when there is a failure to control them (Clark, Ball, & Pape, 1991). A study examined the emotional responses of individuals with anxiety and mood disorders by showing two groups of subjects an emotion-provoking film. One group was given the rationale for suppressing emotions and the other was given the rationale for accepting emotions. In response to the films, researchers found that the acceptance group showed less negative affect and decreased heart rate, whereas the suppression group showed increased heart rate (Campbell-Sills, Barlow, Brown, & Hofmann, 2006). Considering this research, it can be argued that control-based approaches to performance enhancement may result in too much self-focused activity

versus focusing on the external demands needed to reach top performance states.

Data show that performing at an effective level requires attention to external stimuli (the task at hand) instead of internal stimuli (thoughts and processes). In 1988, a study of volleyball athletes by Crocker, Alderman, and Smith (1988) implemented meditation-like procedures with training for coping with emotional states. Results of the study showed a reduction in negative thoughts and significant performance improvements among the volleyball athletes' ability to receive service in match play. This suggests that the athletes were able to process negative states more efficiently while keeping their focus on their performance at hand. Early studies such as this one helped in the development of the current mindfulness methods used by sports psychologists today. These methods will be the focus of the next section.

Mindfulness: A new outlook. The benefits of mindfulness have been an area of study that has grown in popularity over the last decade and a half and, in the context of sport and performance psychology, it is becoming increasingly popular because it has been found to reduce the cognitive activities of worry and anxiety, which have been shown to impede performance (Gardner & Moore, 2012). As previously discussed, sport and performance psychology has been dominated by traditional PST methods, which work primarily towards the controlling of internal processes with the hope of creating the ideal performance state (Meichenbaum, 1977). While at the outset of a negative experience it seems logical to use control-based strategies to reduce cognitive activity, mindfulness exercises (e.g., meditation) expose just how much cognitive activity these control strategies require. Mindfulness is beneficial because it reduces anxiety while expending less mental energy (Farb et al., 2010; Brefczynski-Lewis et al., 2007). A more

specific breakdown of a model and the function of mindfulness in sports will now be carried out.

Mindfulness-acceptance-commitment approach. The mindfulness-acceptance-commitment (MAC) approach developed by Gardner and Moore (2007) for sport and performance enhancement is a growing and popular mindfulness-based technique that draws heavily upon acceptance and commitment therapy, commonly known as ACT (Hayes, Strosahl, & Wilson, 1999). ACT is a quickly growing modality within the psychotherapeutic arena, which trains individuals to accept rather than control what is happening inside and outside of them and commit to value-based goals. When a person experiences an emotional response to an external stimulus (i.e., experiencing anxiety before or during a presentation or sports match) and then thinks about those situations later he or she is likely to experience anxiety directly related to those thoughts. Efforts to control these thoughts can lead to “experiential avoidance,” which is basically an unwillingness to stay with difficult, unpleasant internal experiences (Hayes, Levin, Luoma, Lillis, & Vildardaga, 2004).

The MAC protocol involves “(a) mindful, non-judging [sic], present-moment attention; (b) acceptance of internal processes such as thoughts, emotions, and bodily sensations (as natural to the human experience); (c) a willingness to remain in contact with these internal experiences; (d) a focus of attention on performance-relevant cues, contingencies, and situational appropriate actions and choices in the service of personal performance and life values (commitment)” (Gardner & Moore, 2007, p. 32).

Acceptance versus avoidance of emotional states. Individuals are often taught early in life that they should not experience some of these naturally occurring states and

should instead work to control or minimize negative thoughts and emotions (e.g., “hold back” tears; ignore what their body is “telling” them). Generally speaking, when humans perceive an experience as negative or “bad” it usually means that there will follow some very real effort to control the resulting feelings and/or avoid situations that may be blamed for causing them. This is what ACT calls experiential avoidance (Hayes et al., 1999). As humans, we never stop thinking, feeling, and experiencing bodily sensations. These experiences will always naturally come and go—this is part of the human experience.

As is being discussed in presenting the MAC model for performance enhancement, rather than fighting an endless fight, accepting these internal states as something natural, realistic, and even good can paradoxically create more “room” inside an individual for focusing on goals that are personally valued. The process of accepting rather than avoiding an internal state without judgment is one of the cornerstones of ACT. Similar to ACT, mindfulness-based techniques such as those found in the MAC approach teach that no emotion or thought is bad in and of itself and that accepting the reality of the experience rather than avoiding minimizes the power the experience has over the individual (Hayes et al., 1999). Moreover, upon acceptance, responding to an internal state by inquiring as to what the body may be trying to communicate about your psychological health is an example of being emotionally intelligent; practicing this in the arena of sports performance can lead to beneficial results for the athlete.

Key concepts in the mindfulness-acceptance-commitment approach. Maybe three of the most important concepts in the MAC approach are willingness, commitment, and mindfulness. In the context of performance, willingness refers to the decision to *fully*

experience thoughts, emotions, and sensations, regardless of whether they are pleasant or not. This willingness to fully experience life as it naturally occurs allows an individual to have access to the full range of life, instead of avoiding inevitable, unpleasant moments that are a normal part of being a human being. This type of willingness enables choices to be made that promote what is really valued instead of choices made for the immediate relief of discomfort (Gardner & Moore, 2007). Commitment, in the arena of the performance, is defined as the process of a making committed action towards behaviors that are in line with activities that allow the individual to strive for his or her personal values.

Of these three concepts, mindfulness is the active ingredient in finding success when employing MAC interventions. As discussed, mindfulness is a concept grounded in Eastern philosophical and religious traditions, described by Jon Kabat-Zinn (1994) as non-judgmentally paying attention in the present moment. The founders of MAC describe it is a process “that promotes greater awareness of internal experiences and the diffusion of one’s thoughts, emotions, and bodily sensations as realities to which one must respond” (Gardner & Moore, 2007, p. 34). Gardner and Moore (2007) describe four basic processes in mindfulness within the MAC context, which are (a) mindfulness helps to minimize efforts to control private, naturally occurring, internal experiences such as thoughts, emotions, and physiological sensations; (b) mindfulness has a positive influence on an individual’s emotional experience; (c) mindfulness espouses that individuals must see their thoughts simply as thoughts instead of absolute realities that they must respond to; (d) mindfulness helps reduce attention/focus on self, increases attention/focus on the task, and reduces anxiety around social performance.

While mindfulness in sport is still in its early years, increasingly more data suggest that it can be helpful for aiding the performance of the whole athlete, both inside and outside the realm of sport. While traditional methods teach the control of inner states, mindfulness-based methods teach acceptance of what is being experienced, so as to free up effort and attention usually given to fighting and judging experience for the task at hand (performing in sport). As has been discussed, one of the greatest benefits of mindfulness for athletes and others is its usefulness for reducing anxiety. Anxiety has been shown to impede performance not only cognitively but also physically. The next section of this review of the literature will examine sport injury, specifically looking at its relationship to anxiety and will explore the literature concerning injury occurrence reduction.

Sports injuries and anxiety. Most would agree that sports injuries are one of the most limiting factors to sports performance. More than just take the athlete out of the game, injury often creates higher levels of depression, anxiety, and lower self-esteem (Leddy, Lambert, & Ogles, 1994). As has been discussed, mindfulness has been shown to be helpful in the arena of sports performance and beyond. However, there has been little research accomplished in an effort to examine what kind of relationship, if any, mindfulness has with sports absence due to injury. Before reviewing the literature regarding injury and anxiety, it is important to define injury as it is discussed in this review. Fuller et al. (2006) defined injury as:

Any physical complaint sustained by a player that results from a football match or football training, irrespective of the need for medical attention or time loss from football activities...an injury that results in a player being unable to take a full

part in future football training or match play as a time loss injury. (p. 193)

The authors go on to explain two types of injuries: (a) traumatic injury and (b) overuse injury. An injury that can be attributed to a specific event is known as a traumatic injury, whereas an injury that is caused by repeated “wear and tear” or micro-traumas, where no identifiable event can be said to be the cause is known as an overuse injury. The types of injury examined in this review are traumatic injuries.

Discussing existing risk factors for sports injuries is important in order to discover if any of these risk factors have an existing relationship with mindfulness. There are numerous studies examining the many complex factors that may lead to a sports injury. Johnson (2007) carried out an investigation of the research in this area and concluded that psychosocial factors such as low social support, low coping resources, life change, emotional state, and high competitive anxiety appeared to be directly or indirectly related to injuries in sport. Johnson’s review of the research included two bodies of literature, which included studies examining psychosocial antecedents of sports injuries and studies examining injury prevention interventions. Among the studies looking at psychosocial impacts on injury, Johnson found that 50% of performers who experienced life stress incurred injury and missed at least three days of practice. Also, negative life events predicted subsequent injuries. Athletes who got injured had a significant increase in daily hassles a week prior to the injury and total life change and negative life change were predictors of how much an athlete was injured.

Johnson found that low coping resources for psychosocial stress were a major predictor of sports injuries. Indeed, coping resources increased for athletes at risk of injury after cognitive behavioral stress reduction interventions were given, and fewer

incidents of injury occurred in athletes with a higher level of social support. Among the studies examining injury occurrence reduction, Johnson found studies suggesting the following interventions to be helpful: biofeedback, relaxation for pain control, relaxation and imagery, and stress management. Similarly, other researchers have found a causal relationship between increased sports injuries and psychosocial stress, limited coping skills, and personality factors such as somatic trait anxiety, stress susceptibility, and psychic trait anxiety (Ivarsson & Johnson, 2010).

In a consensus statement made by 13 team physicians, anxiety was identified as the most consistent psychological factor associated with athletic injury (Herring, Kibler, & Putukian, 2006). The literature appears to back this up. Specifically, there is evidence suggesting a strong relationship between high anxiety and athletic injury (Chan & Grossman, 1988; Kolt & Kirkby, 1994; Lavellee & Flint, 1996; Leddy et al., 1994). Kolt and Kirkby (1996), found that gymnasts reporting high levels of competitive trait anxiety suffered more injuries while playing sports than their less anxious peers. Also, athletes who had a history of being injured while playing sports reported higher levels of anxiety than those who did not (Lavellee & Flint, 1996; Leddy et al., 1994). In a correlational study looking at the relationship between stress, competitive anxiety, mood state, and social support to sports injuries, researchers examined 55 athletes and found high competitive anxiety and tension/anxiety to be significantly related to the rate of injury (Lavellee & Flint, 1996). In addition to this, they found tension/anxiety, anger/hostility, and negative mood to be significantly related to the severity of the injury. Similarly, another study with a much larger sample size of 845 athletes who were screened for mood and stress types, showed that psychological measures of mood and stress can be

useful in predicting athletic injury (Galambos, Terry, Moyle, & Locke, 2005).

The literature has shown that high levels of cognitive anxiety (mental worry) and somatic anxiety (tension in the body) can also predispose an athlete to injury. In a study presenting an instrument to measure re-injury anxiety, Walker, Thatcher, and Lavalle (2010) posit that cognitive anxiety causes athletes to be concerned about irrelevant cues which can narrow an athlete's peripheral vision, making them less perceptive of their surroundings, which in turn can lessen the reaction time to external events such as a sudden change in their environment or an approaching opponent (Williams & Anderson, 1998). Additionally, when an athlete experiences heightened muscle tension as a result of increased somatic anxiety, there is a higher chance of tearing or straining the muscles that are tighter than normal (Mullen, Lane, & Hanton, 2009).

As has been discussed, mindfulness has been shown to benefit the performance of an athlete (Baltzell et al., 2014; Gardner & Moore, 2012; Gooding & Gardner, 2009; Kabat-Zinn et al., 1985; Pineau, Glass, Kaufman, & Bernal, 2014), but can it also be a mitigating factor in decreasing the occurrence of sports injuries? In a search for existing literature examining this specific relationship, only one study was found. Ivarsson, Johnson, Anderson, Fallby, and Altemyr (2015) applied a 6-month mindfulness program based on the MAC approach to 21 adolescent soccer players to determine whether mindfulness could be shown to prevent injury. The authors of the study found no statistically significant difference in the occurrence of injury throughout the duration of the study between the control and intervention group. The authors did, however, find a medium effect size and found that the intervention group experienced fewer injuries (67% remained injury free) than those participants in the control group (40% remained

injury free).

It appears important to note that, in addition to the other studies in this review of the literature, two previous studies conducted by Ivarsson and his colleagues also found anxiety to be associated with increased injury risk. In one study (Ivarsson, Johnson, & Podlog, 2013) of 56 professional Swedish soccer players, they found negative-life-stress, daily hassle, and trait anxiety to be significant predictors of injury and concluded that athletes and coaches would benefit from employing stress-management interventions alongside athletic development training. In another study (Ivarsson, Johnson, Lindwall, Gustafsson, & Altemyr, 2014) of 101 junior elite high school soccer players, the authors measured self-reported daily hassles during a 10-week period and found that those who reported no decrease in daily hassles over that course of the study had more injury occurrence. Thus, the rationale Ivarsson et al. (2015) had for testing the impact of mindfulness on injury prevention appears to have been informed by these two studies. Interestingly, the authors of the study point out that most of the studies exploring the impact of psychological interventions on sports injuries have only used traditional PST techniques; this only merits a closer examination of mindfulness.

Rationale. As can be seen, injury in sport is a complex issue that includes many factors. Among those factors predicting injury, anxiety appears to be one of the most significant. Additionally, as has been examined above, there is evidence suggesting that mindfulness and anxiety have a strong inverse relationship. Therefore, exploring whether the presence of mindfulness in an athlete can be a mediating factor for his or her risk of injury would seem a worthwhile endeavor.

Of specific interest to the current study was the theme in the literature of the

athletes' preoccupation with psychosocial stressors and anxiety that may affect concentration on the task at hand (e.g., training, competition) and therefore increase the risk for injury and sports absence. Considering that one of the most important benefits of mindfulness is increased acceptance and therefore tolerance of external and internal aversive events that allows for greater attention to be given to the task at hand, the level of mindfulness an athlete has may be helpful in determining their risk for injury. As examined previously in this review, the existing literature suggests a positive relationship between anxiety and injury in athletes. Considering what we know about the positive effects mindfulness has in an athlete experiencing anxiety and stress, one natural question that may arise is: what kind of relationship does mindfulness have with the occurrence of sports injury among athletes? More specifically, does the level of trait mindfulness and anxiety/stress a collegiate athlete possesses mediate incidents of sports injury? The goal of the current study was to explore these relationships.

While the findings in the aforementioned study (Ivarsson et al., 2015) were not statistically significant, the authors argue that the medium-sized effect suggests mindfulness may be able to reduce the amount of injury to an extent that would be practically or clinically significant (Cohen, 1990) for athletes, coaches, and other stakeholders in the arena of sport performance. Indeed, in taking into consideration the context of what these results mean in the real world, Ivarsson and his colleagues emphasize that reducing and/or limiting injury in athletes to any degree is quite significant to those who endure most of the psychological, medical, emotional, and financial costs of sports injuries. With this in mind, the medium effect size Ivarsson and his colleagues' mindfulness intervention had on the number of sports injuries suggest

further scientific investigation is warranted.

Some of the limitations of Ivarsson's study include studying only 41 participants, all of whom were in high school, and only studying subjects in one sport, soccer. Considering the variance in types of stress (e.g., psycho-social, developmental stressors), and amounts of stress most adolescents are known to experience, finding many subjects in this age range who experience consistent, lower levels of stress may be more challenging. Also, a larger sample size (i.e., drawing subjects from varying sports) could aid in helping researchers illuminate any unique relationships other sports may introduce. Furthermore, since Ivarsson et al. (2015) includes the causal connection between stress and sports injuries in his rationale for his study, including a measure for stress would have seemed helpful for both validating existing research and the author's own rationale for introducing mindfulness interventions for injury prevention.

Like Ivarsson et al. (2015), the current study's aim was to examine the relationship between mindfulness and sports injuries. However, unlike the aforementioned study, which was experimental in design, and created with the purpose of reducing and preventing sports injuries, the present study was a correlational study designed to examine the specific relationships between three variables: (a) sports injury occurrence; (b) mindfulness, and (c) anxiety. This study was unique in that (a) no other known existing research efforts have examined the direct relationships between trait mindfulness, anxiety, and sports injury occurrence; (b) previous research examining sports injuries and mindfulness has been limited to only one sport, while this study examined athletes from various sports; (c) apart from this study, there appears to be a lack of research examining sports injuries and mindfulness specifically among collegiate

athletes.

Research questions and hypothesis. The question being asked in this study was as follows: what is the relationship between the level of trait mindfulness, anxiety, and sports absence due to injury among collegiate athletes? The author of this study hypothesized that (a) athletes reporting lower trait mindfulness would report more time lost playing because of injury; (b) athletes who reported higher levels of anxiety would experience more time lost playing because of injury; (c) athletes who reported higher levels of mindfulness would report lower levels of anxiety.

Chapter Two

As has been discussed, existing literature indicates that mindfulness-based techniques are not only growing in popularity throughout the field of psychology as a whole but are also gaining prominence as first-line interventions for sports psychologists, coaches, and players alike. For the athlete in the arena of sports performance, acquiring an injury can be a monumental problem. Therefore, it is beneficial for future research to seek answers to questions that will help stakeholders involved in sports psychology understand the nature of a sports injury. What elements predispose an athlete to be at higher risk of injury? What, if any, protective factors can be introduced to limit this risk? While a significant amount of the existing literature appears to have found a solid connection between higher anxiety and stress and sports injury occurrence, the relationship that mindfulness has with sports injury occurrence is limited.

The purpose of the current study was two-fold: (a) to explore further the relationship between sports injuries and anxiety while (b) introducing the impact of mindfulness into this relationship. As previously mentioned, the author hypothesized that (a) athletes who reported lower trait mindfulness would also report experiencing more time lost playing because of injury; (b) athletes who reported higher levels of stress and anxiety would also report experiencing more time lost playing because of injury; and (c) athletes who reported higher levels of mindfulness would also report lower levels of anxiety.

Participants

Participants for this study totaled 95. Among them, there were 64 females and 31 males who were active athletes in the following sports: soccer, volleyball, basketball,

softball, golf, football, cheerleading, track and field, and cross-country. For efficiency during data analysis, because most of the participants were made up of soccer and volleyball players, these two sports constituted their own group. The remaining athletes were formed into a single group. While it was not a primary objective to test for gender differences, these are observed in the following findings and will be discussed. Most participants in this study were a convenience sample taken from a university located in the Northwest region of the United States. The university's enrollment for the 2015/2016 school year was 1,510 students. Participants were also taken from Facebook via a hyperlink that directed them to informed consent and the surveys. The sample of participants for this study were between the ages of 18 and 25. The method for data collection included contacting subjects through electronic mail and Facebook requesting their participation. Participants were given a hyperlink directing them to the developed survey, which included the informed consent and all the forms and measures necessary. The participants who gave their consent to participate in this study were entered into a drawing to win one of three \$35 Visa cash cards.

Table 1

Demographic Characteristics of Sample

Sex	Sport				TOTAL
	Soccer	Volleyball	Other		
Male	<i>N</i>	22	0	9	31
	%	48%	0%	31%	100%
	<i>M(yrs.)</i>	20.14	0	20.67	20.30
	<i>SD(yrs.)</i>	1.42	0	3.32	2.12
Female	<i>N</i>	24	20	20	64
	%	52%	100%	69%	100%
	<i>M(yrs.)</i>	19.55	20.05	19.65	19.74
	<i>SD(yrs.)</i>	1.22	1.61	1.27	1.37
TOTAL	<i>N</i>	46	20	29	95
	%	100%	100%	100%	100%
	<i>M(yrs.)</i>	19.84	20.05	19.65	19.92
	<i>SD(yrs.)</i>	1.34	1.61	2.11	1.66

Note. There were two females and one male who did not report age.

Materials and Procedures

Demographics and injury questionnaire. Participants completed questions about sociodemographic characteristics and questions regarding their experiences with sports injuries (see Appendix B). These questions included information about age, sex, and ethnicity, current year in school, sports division, current sport, and incidents of injury. An injury was measured by asking participants to report the number of injuries experienced as well as the length of time for each injury. Due to the wide ranges of time each athlete spent out of competition due to injury, total time lost playing due to injury was reported rather than the sum of injury incidents.

Five-facet mindfulness questionnaire. The Five-Facet Mindfulness Questionnaire (FFMQ) (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006) was developed through a factor analytic study of five independently developed mindfulness questionnaires and is a 39-item questionnaire measuring five factors that represent various aspects of mindfulness. These factors include observing, describing, acting with awareness, non-judging of inner experience and non-reactivity to inner experience. Examples of items within the questionnaire include “I watch my feelings without getting lost in them”, and “When I do things, my mind wanders off and I’m easily distracted.” A five-point Likert scale is used to code responses and ranges from (1) *never or very rarely true* to (5) *very often or always true*. Baer et al. (2008) found internal consistency was shown in several models in a study that supported the construct validity and when tested again (Christopher, Neuser, Michael, & Baitmangalkar, 2012), the reliability and validity of all five facets was found to be acceptable, showing a Cronbach’s alpha coefficient of .87 for measuring total mindfulness. Among measures for mindfulness, the FFMQ

appeared as the best choice for the current study considering its strong psychometrics and consistent use among researchers (Siegling & Petries, 2014).

Sports anxiety scale – 2. The Sports Anxiety Scale – 2 (SAS-2) (Smith, Smoll, Cumming, & Grossbard, 2006) is a multidimensional measure of somatic and cognitive trait anxiety in athletic performance settings that looks at three main categories of anxiety: Somatic, Worry, and Concentration Disruption. It was developed based on the original Sports Anxiety Scale (Smith, Smoll, & Schutz, 1990), which was found to have limitations in measuring children. Due to this restructuring, the SAS-2 was found to have better factorial validity than its predecessor, while also yielding good construct validity (Smith et al., 2006). Additionally, in 2015, Ramis, Viladrich, Sousa, and Jannes evaluated the metric and scalar invariance of the SAS-2 among the four sampling variables of language, gender, age, and type of sport. The authors found evidence of invariance across these samples and endorse the use of the SAS-2 for multi-group research due to the reliability of its factorial structure. Additionally, because mindfulness has been found to have an inverse relationship with trait anxiety (Walsh, Balint, Sj, Fredericksen, & Madsen, 2009) the SAS-2 was chosen for its measurement of trait rather than state anxiety.

State-trait anxiety inventory. The State-Trait Anxiety Inventory (STAI) (Spielberger, 1989) is a tool with 40 questions that measure anxiety in adults. It is unique in that it distinguishes between state anxiety (20 items) and trait anxiety (20 items) and between feelings of anxiety and depression. The STAI takes approximately 10-20 minutes. The items are answered based on a 1-4 scale where 1 is “Not at all” and 4 is “Very much so.” Studies by Spielberger (1989) show that test-retest correlations equaled

.54 for the State Anxiety items and .86 for the Trait Anxiety items. The principal investigator of this project purchased the rights to use this measure from Mindgarden.com.

Summary

The purpose of this study was to examine the relationship between mindfulness and the amount of competitive playing time an athlete loses due to an injury accrued while participating in a sport. Participants were given a questionnaire that asked about standard sociodemographic information and about the quantity and quality of injuries sustained during competitive play. Mindfulness was measured using the FFMQ and anxiety was measured using the SAS-2 and the STAI. As previously stated, this study hypothesized that (a) more time loss playing sports would be reported in athletes who reported lower mindfulness; (b) more time loss playing sports would be reported in athletes who reported higher levels of stress and anxiety; and (c) lower levels of anxiety would be reported in athletes who showed higher mindfulness scores. Considering the previously examined positive relationship between sports injuries and anxiety, as well the benefits mindfulness appears to have on anxious individuals the theoretical framework of this study was built on the speculation that mindfulness could help mitigate sports injury occurrence.

Chapter Three

Preparation of Data for Analysis

Mindfulness was quantified by calculating the total mindfulness from each participant's Five Facet Mindfulness Questionnaire (FFMQ) results as well as calculating the total for each of the sub-scales of the FFMQ (i.e., Observing, Describing, Acting with Awareness, Non-judging, and Non-reactivity). Anxiety was quantified by separately calculating the scores of each participant's State-Trait Anxiety Inventory (STAI) and Sports Anxiety—2 (SAS) scores. Although participants were asked to report the total amount of injuries they experienced as an athlete, it was decided that a more meaningful quantifier for injury would be found by calculating the total amount of time each athlete spend away from competition because of their injuries.

Data Analysis

This study hypothesized that (a) athletes who reported lower trait mindfulness would experience more time lost playing because of injury; (b) athletes who reported higher levels of anxiety would experience more time lost playing because of injury; and (c) athletes who reported higher levels of mindfulness would report lower levels of anxiety.

In the following statistical analyses, mindfulness and anxiety were the independent variables. The primary dependent variable was time out of sports due to injury, which was measured in days. SPSS (IBM Statistical Package for the Social Sciences 25) was used to process all data retrieved from the participants of this study. I first ran bivariate correlational analyses to test the study hypotheses, examining the relationships between mindfulness, anxiety, and sports absence due to injury. After

testing the study hypotheses, I used bivariate correlational analyses to explore the relationships between all of the sub-scales of the measures and sports absence due to injury. Additionally, I performed these same analyses for males and females to determine the strength of these relationships between genders specifically.

Reliability. Because estimates of correlations between variables are often weakened by measurement error, the Pearson correlations yielded in SPSS were corrected for attenuation by inputting the Alpha scores for each measure and the Pearson correlations into the formula for correcting for attenuation. The corrected correlations for each pair of variables yielded a sum similar to the Pearson correlations, indicating that the two tests (e.g., the STAI and FFMQ) are measuring their respective traits accurately. Therefore, the measures used in the study proved to be consistent with previous research and reflected strong reliability.

Results

With regard to effect size, these results will be discussed using the suggested guidelines of Cohen (1988, 1992) and explained as follows:

- a. $r = < .10$ (negligible effect)
- b. $r = .10$ (small effect)
- c. $r = .30$ (medium effect)
- d. $r = .50$ (large effect)

Analyses testing the study hypotheses. First, I analyzed the specific variables relating to the study hypotheses as follows: a bivariate correlational analysis tested the relationship between mindfulness and time out of sports to determine if higher mindfulness is positively related to less time out of sports. I then sought to determine if

higher levels of anxiety had the predicted positive relationship with time out of sports due to injury. For this, I again ran correlational analysis between state and trait anxiety and time out of sports and also ran a separate analysis on participants' level of sports anxiety and amount of sports absence. Lastly, I ran a final correlation seeking to determine if the athletes who reported higher mindfulness scores reported lower levels of anxiety.

First hypothesis. The primary hypothesis that athletes reporting higher mindfulness scores would experience less time away from their sports because of injury was not supported in the findings. Conversely, there was a small-to-medium sized effect in the relationship between days out with injury and mindfulness, $r(95) = .24$, meaning increased mindfulness correlated with increased sports absence due to injury.

Second hypothesis. The secondary hypothesis that athletes reporting higher levels of total anxiety (state, trait, and sport anxiety) would report more time away from their sports due to injury was partially supported in the findings. A correlational analysis performed on the entire sample yielded a small-sized effect between the relationship of sport absence due to injury and total anxiety (sport, trait, and state anxiety) ($r(95) = .10$, $.06$, $.16$ respectively).

Third hypothesis. The third hypothesis that higher levels of mindfulness among athletes would also result in lower levels of anxiety was unsupported in the findings. Instead, higher levels of mindfulness were related to higher levels of all types of anxiety. Among all athletes, sports anxiety was shown to have a small-to-medium-sized effect in relationship with mindfulness ($r(95) = .26$), while state and trait anxiety showed smaller effect sizes ($r(95) = .14$ and $r(95) = .18$ respectively).

Differences between genders. Pertaining to the second hypothesis that athletes with higher anxiety would experience more sports absence due to injury, male athletes alone showed a medium-to-large sized effect in the correlation between their level of sports anxiety and sports absence, $r(31) = .41$. Specifically, among the aspects of the SAS-2 (i.e., Somatic, Worry, and Concentration Disruption), male athletes with somatic anxiety and worry tended to report more time away due to injury ($r(31) = .41$ and $.47$ respectively), while concentration disruption showed a negligible effect size in the relationship with time away due to injury ($r(31) = .09$) Table 7). In other words, greater sports anxiety self-reported by male athletes was associated with more time out of their sports due to injury.

Pertaining to the third hypotheses that athletes reporting higher levels of mindfulness would also report higher levels of anxiety, among females, total anxiety (State, Trait, and Sport) showed a medium-sized effect in the relationship with mindfulness ($r(64) = .27$, $.28$, and $.31$ respectively). Among males, sports anxiety showed a small-to-medium effect size in relationship with mindfulness ($r(31) = .17$). In other words, when examined separately, both female and male athletes who reported higher levels of total anxiety also reported higher levels of mindfulness. However, among males, reported state and trait anxiety both had a negative correlation with reported mindfulness, although there was only a small-to-negligible effect size in this relationship ($r(31) = -.14$ and $r(31) = -.04$ respectively).

Table 2

Reliability of Measures Used

	Alpha Score
Five-Facet Mindfulness Questionnaire	.83
-Observing	.77
-Describing	.37
-Acting with Awareness	.88
-Non-judging	.87
-Non-reactivity	.60
State Anxiety Inventory	.52
Trait Anxiety Inventory	.89
Sport Anxiety Scale 2	.93
-Concentration Disruption	.76
-Somatic	.81
-Worry	.85

Note. Bold represents the primary measure and non-bold underneath primary measure represents the sub-scales of that primary measure.

Note. $r < .10$ (negligible effect); $r = .10$ (small effect); $r = .30$ (medium effect); $r = .50$ (large effect).

Table 3

Correlation Corrected for Attenuation

	Pearson Correlation	Corrected Correlation
State Anxiety and FFMQ	.14	.15
Trait Anxiety and FFMQ	.18	.21
Sport Anxiety and FFMQ	.26	.28

Table 4

Correlations of Variables Among All Participants (N=95)

	Sp. Absence	Sport Anx.	Trait Anx.	State Anx.	Mindfulness
Sp. Absence	1	.10	.06	.16	.24
Sport Anx.		1	.38	.47	.26
Trait Anx.			1	.59	.18
State Anx.				1	.14
Mindfulness					1

Note. $r < .10$ (negligible effect); $r = .10$ (small effect); $r = .30$ (medium effect); $r = .50$ (large effect).

Exploratory analyses. After testing the study hypotheses, I ran exploratory analysis between the five sub-scales (Observing, Describing, Acting with Awareness, Non-judging, and Non-reactivity) of the FFMQ and the total STAI scores to determine if certain aspects of mindfulness were negatively or positively correlated with state and trait anxiety. Similarly, I analyzed how the sub-scales (Somatic, Worry, and Concentration Disruption) of the SAS-2 related to the sub-scales of the FFMQ to determine the relationship between sports anxiety and the five aspects of mindfulness.

Exploratory analysis of the measures and their sub-scales yielded some interesting results. Among all athletes, both state and trait anxiety were found to have inverse relationships with nonreactivity, one of the five aspects of mindfulness ($r(95) = -.37$ and $-.29$, respectively) (Table 5). Nonreactivity is indicated when participants respond high on scale-item questions on the FFMQ such as, “I perceive my feelings and emotions without having to react to them,” “I watch my feelings without getting lost in them,” or “In difficult situations, I can pause without immediately reacting” (Baer et al., 2006).

Differences between genders. For all the above relationships examined in the study hypotheses and the exploratory analyses, I performed separate correlational analysis for males and females to determine the strength of the relationships between genders. Among female athletes, there was a medium-to-large effect size in the relationship between nonreactivity and state anxiety ($r(64) = -.44$) and a medium effect size in the relationship between nonreactivity and trait anxiety ($r(64) = -.32$). Analysis of their male counterparts did not yield large effect sizes, but the relationships between nonreactivity and state and trait anxiety were still inverted (State: $r(31) = -.18$ and Trait: $r(31) = -.24$). Additionally, a small effect size was found in a negative relationship

between sports anxiety and nonreactivity in females ($r(64) = -.13$). The data suggests that athletes who are nonreactive in this way may experience less situational (state) and personality-based (trait) anxiety.

Additional exploratory findings included a strong negative relationship between two types of anxiety and observing among male athlete participants. The mindful skill of observing is indicated when participants respond high on scale-item questions on the FFMQ such as, “When I’m walking, I deliberately notice the sensations of my body moving,” “I pay attention to how my emotions affect my thoughts and behavior,” “I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing,” or “I notice how foods and drinks affect my thoughts, bodily sensations, and emotions” (Baer et al., 2006). There was a large effect size in the inverse relationship between state anxiety and observing in males ($r(31) = -.61$) (Table 7). Similarly, there was a medium effect size in the inverse relationship between sports anxiety and observing among male athletes ($r(31) = -.28$). These results suggest that male athletes who can mindfully observe may also experience less state anxiety and sports anxiety.

Summary

In summary, this study failed to confirm the first hypothesis that higher levels of mindfulness are associated with more sports absence because of injury. On the contrary, the results suggested a small positive relationship between how mindful collegiate athletes are and how long they spend on the sidelines injured. Next, the second hypotheses was only partially supported; among all athletes, those who reported more total anxiety did also report missing out more due to injury. However, when examining only male athletes, it was found that those who specifically reported feeling more somatic

anxiety and worry over how they will perform (sports anxiety) reported much more sports absence due to injury. Finally, contrary to my third hypotheses, athletes who reported higher overall mindfulness also reported higher overall anxiety. There was a small exception to this when studying only male athletes, who reported minimally lower state and trait anxiety when they reported being more mindful.

Additional exploratory correlational analyses between the subscales of mindfulness and sports anxiety revealed that athletes reporting higher levels of some types of mindfulness also reported lower levels of some types of anxiety. Specifically, all athletes who scored high on nonreactivity and observing also reported lower anxiety. When looking at gender differences, it was found that nonreactive males reported lower state and trait anxiety and nonreactive females reported much lower state and trait anxiety and slightly lower sports anxiety. Additionally, male athletes who scored high in observing reported much lower state anxiety and moderately lower sports anxiety.

Table 5

Correlations of Sub-Scales of Measures with Primary Variables Among All Participants (N=95)

	Sp. Absence	Sport Anx.	Trait Anx.	State Anx.	Mindfulness
Somatic	.10	.90	.33	.46	.20
Worry	.14	.84	.33	.38	.21
Concentration	-.03	.85	.30	.35	.29
Observing	.12	-.03	.02	-.16	.68
Describing	.19	.11	.04	-.03	.60
Awareness	.17	.35	.19	.33	.54
Nonjudgment	.10	.27	.38	.38	.71
Nonreactivity	.15	-.05	-.29*	-.37*	.39

Note. Items in non-bold represent sub-scales of SAS-2. Items with bold headings represent sub-scales of FFMQ.

*Correlation is significant at the 0.01 level (2-tailed).

$r < .10$ (negligible effect); $r = .10$ (small effect); $r = .30$ (medium effect); $r = .50$ (large effect).

Table 6

Correlations of Sub-Scales of Measures with Primary Variables Among Females (N=64)

	Sp. Absence	Sport Anx.	Trait Anx.	State Anx.	Mindfulness
Somatic	-.01	.91	.38	.45	.25
Worry	.02	.88	.44	.33	.25
Concentration	-.07	.87	.33	.32	.36
Observing	.13	.08	.10	.04	.69
Describing	.16	.22	-.01	.06	.66
Awareness	.25	.37	.28	.34	.52
Nonjudgment	.05	.26	.46	.47	.69
Nonreactivity	.01	-.13	-.32*	-.44*	.20

Note. Items in non-bold represent sub-scales of SAS-2. Items with bold headings represent sub-scales of FFMQ.

*Correlation is significant at the 0.01 level (2-tailed).

$r < .10$ (negligible effect); $r = .10$ (small effect); $r = .30$ (medium effect); $r = .50$ (large effect).

Table 7

Correlations of Sub-Scales of Measures with Primary Variables Among Males (N=31)

	Sp. Absence	Sport Anx.	Trait Anx.	State Anx.	Mindfulness
Somatic	.41*	.87	.22	.50	.13
Worry	.47*	.77	.07	.51	.14
Concentration	.09	.82	.20	.46	.14
Observing	.15	-.28	-.17	-.61	.65
Describing	.30	-.13	.13	.23	.49
Awareness	.02	.33	.04	.33	.56
Nonjudgment	.25	.30	.18	.14	.76
Nonreactivity	.37	.17	-.24	-.18	.72

Note. Items in non-bold represent sub-scales of SAS-2. Items with bold headings represent sub-scales of FFMQ.

*Correlation is significant at the 0.01 level (2-tailed).

$r < .10$ (negligible effect); $r = .10$ (small effect); $r = .30$ (medium effect); $r = .50$ (large effect).

Chapter Four

Discussion

The purpose of this study was to examine the relationships between mindfulness, anxiety, and injury in collegiate athletes primarily to determine if higher levels of mindfulness are associated with a reduction in the amount of time these types of athletes spend on the sidelines injured. Participants were asked to provide basic demographic information as well as how much time they have spent out of their sport in their college career due to injury. Participants were then given the Five Facet Mindfulness Questionnaire (FFMQ) (Baer et al., 2006) to measure mindfulness, the State Trait Anxiety Inventory (STAI) (Spielberger, 1989) to measure state and trait anxiety, and the Sport Anxiety Scale (SAS-2) (Smith et al., 2006) to measure sport anxiety. I proposed the following hypotheses: (a) athletes reporting lower trait mindfulness will experience more time lost playing because of injury; (b) athletes reporting higher levels of anxiety will experience more time lost playing because of injury; and (c) athletes reporting higher levels of mindfulness will report lower levels of anxiety.

The first hypothesis of this study was not confirmed. Participants reporting lower mindfulness did not experience more time lost playing because of injury. This indicates a lack of evidence of a relationship between mindfulness and an athlete's time away from his or her sport due to injury. Furthermore, this study failed to replicate a similar study by Ivarsson et al. (2015). Although Ivarsson's study did not find a statistically significant difference in occurrence of injury throughout the duration of the study, they did find a medium effect size and found that the intervention group experienced fewer injuries (67% remained injury free) than those participants in the control group (40% remained

injury free). This was the only research found indicating a relationship between higher mindfulness and fewer injuries among athletes.

In developing the study at hand, the theoretical framework was built on the results of existing research showing positive relationships between anxiety and injury occurrence in athletes (Chan & Grossman, 1988; Galambos et al., 2005; Herring et al., 2006; Johnson, 2007; Kolt & Kirkby, 1994; Lavallée & Flint, 1996; Leddy et al., 1994; Walker et al., 2010; Williams & Anderson, 1998) and results showing inverse relationships between mindfulness and anxiety (Davidson, 2002; Gardner & Moore, 2007; Goldin et al., 2012; Hoffman et al., 2010; Kabat-Zinn., 2003; Kabat-Zinn et al., 1992). However, the amount of existing research examining the relationship between mindfulness and sports injury occurrence is severely lacking. This lack was the main catalyst prompting the present examination.

The fact that these results indicate a lack of a relationship between mindfulness and sports absence due to injury neither confirm nor disconfirm the theoretical underpinnings of this study. This is because the research question asked in this examination is one that is only beginning to be explored. What do these results mean for the theory underlying the use of mindfulness in sports? Even if, as it appears in this study, mindfulness does not directly relate to the decrease of injury in the athlete, the role of mindfulness in sport is still a very important one. Gardner and Moore (2012) among the many others researchers mentioned in this examination have found consistent evidence that suggests mindfulness not only aids in the peak performance of an athlete but also aids in the overall life satisfaction, happiness, and peace of an athlete. The impact mindfulness is having on the sport performance arena is indicated by the effect it

is having on those who practice it: more compassion (Shapiro et al., 2007), better communication skills (Newsome et al., 2006; Schure et al., 2008), increased overall wellness (Rybak & Russell-Chapin, 1998), and a better quality of life (Bruce et al., 2002).

Results of this study partially supported my second hypothesis: all athletes who reported higher levels of all types of anxiety (state, trait, and sports anxiety) also reported more sports absence due to injuries. However, when examining all athletes, the findings indicated that the relative strengths of correlations between higher levels of anxiety and more sports absence were not strong.

Further exploratory findings were interesting in that they offered support for my second hypothesis. When examining gender differences, male athletes who reported high somatic and worry anxiety also reported missing significantly more time playing due to being injured. Because of this, these results showed support for the large amount of research showing anxiety and stress to be directly related to increased injury occurrence among athletes (Chan & Grossman, 1988; Galambos et al., 2005; Herring et al., 2006; Johnson, 2007; Kolt & Kirkby, 1994; Lavallée & Flint, 1996; Leddy et al., 1994; Walker et al., 2010; Williams & Anderson, 1998). Among the different types of anxiety, competitive anxiety and worry appear more in the existing literature (Johnson, 2007; Kolt & Kirkby, 1996; Lavellee & Flint, 1996), although somatic anxiety has also been cited as well (Ivarsson & Johnson, 2010; Mullen et al., 2009).

Unlike many of the studies above that uncovered a relationship between injuries and state and/or trait anxiety, the study at hand only found a significant relationship between injury and sports performance anxiety (somatic and worry anxieties). Somatic

anxiety, also commonly described as physical anxiety, can be experienced often as a feeling of contraction, tightness, or restlessness in the body. We have already reviewed how somatic anxiety has been shown to predict physical injury (Ivarsson & Johnson, 2010; Mullen, Lane, & Hanton, 2009). Although further research findings which can replicate these results would be needed in order to make a more solid argument, one can speculate from the results found here that male athletes appeared to be affected more by the experience of physical anxiety and worry about competitive play than their female counterparts. Perhaps the fact that males generally have more muscle mass and could more easily tear or pull these muscles due to somatic anxiety is one explanation for this apparent relationship. Certainly, due to these findings, more research exploring the impacts of somatic anxiety in male athletes may be warranted.

The findings of this study did not fully support my third hypothesis. Higher levels of overall mindfulness did not appear to have a significant negative relationship with all athletes' reported anxiety. Instead, mindfulness appeared to have a strong positive relationship with anxiety. This was true especially among female athletes, who reported more total anxiety when reporting higher overall mindfulness. While these findings indicate a lack of a strong negative relationship between mindfulness and total anxiety among all athletes, male athletes alone did show less state and trait anxiety, albeit minimally when they were more mindful.

In light of the existing research showing the positive benefits of mindfulness on anxiety (Davidson, 2002; Farb et al., 2010; Gardner & Moore, 2007; Goldin et al., 2012; Hoffman et al., 2010; Kabat-Zinn, 2003; Kabat-Zinn et al., 1992), it is surprising that the current study did not yield similar direct relationships between overall mindfulness and

anxiety. However, after conducting some exploratory analyses, it was found that some types of mindfulness did negatively correlate with anxiety. Among the five facets of mindfulness, all athletes who scored high on nonreactivity and observing reported much lower total anxiety. Specifically, females who reported they were able to mindfully notice their emotions without reacting to them (i.e., without panicking, trying to change their emotions, or get lost worrying about them) reported significantly less state and trait anxiety. Similarly, male athletes showed significantly less state anxiety and moderately less sports anxiety when they also reported high ability in being able to observe how emotions, actions, and environments affect bodily senses, thoughts, and behaviors and vice versa. As stated in the findings, the mindfulness skill of observing is indicated when participants respond high on scale-item questions on the FFMQ such as, “When I’m walking, I deliberately notice the sensations of my body moving” or “I pay attention to how my emotions affect my thoughts and behavior” (Baer et al., 2006). In other words, being able to notice the sensations of the body when it is moving and paying attention to how feelings impact thoughts and behavior appear to be related with lower state anxiety and/or sports performance anxiety.

In a review of the existing literature (Davidson, 2002; Farb et al., 2010; Gardner & Moore, 2007; Goldin et al., 2012; Hoffman et al., 2010; Kabat-Zinn, 2003; Kabat-Zinn et al., 1992), while many studies yielded results indicating a negative relationship between anxiety and mindfulness, no research was found examining how different aspects of mindfulness relate to anxiety. While more research would be needed to make a stronger case, these results appear to indicate that anxious athletes may benefit from practicing specifically those aspects of mindfulness that enhance nonreactivity and

observing skills.

Traditionally, athletes have been encouraged to “control” their performance anxiety, to “toughen up”, or told that the name of the game is “mind over matter” (Hardy, Jones, & Gould, 1996). However, the old adage, “what you resist persists” could commonly pertain to the experience of the human mind. Mindfulness challenges an athlete to nonjudgmentally observe his or her anxiety instead of rejecting or resisting (Kabat-Zinn, 2003). As the exploratory results of this study indicated, the mindful athlete who was nonreactive and able to observe their emotional experience experienced fewer injuries. Considering this, it would appear that athletes experiencing anxiety about sports performance may benefit from specific training on how to not react and how to instead observe anxiety.

Athletes who train using the mindfulness-acceptance-commitment (MAC) approach developed by (Gardner & Moore, 2007) practice mindful acceptance of their emotions and commitment to value-based goals in their performance. Similarly, one could speculate that athletes who develop their abilities in mindful nonreactivity and observing may be able to mitigate anxiety over sports performance and therefore may experience less time on the sidelines due to injury. Furthermore, athletes who are able to effectively treat somatic anxiety and worry before competition may also experience such relief from incidents of injury. Ideas for how these results may benefit practitioners in the real world will now be discussed.

Practical Implications

Currently, as mindfulness continues to increase in popularity, it is hopeful that researchers and practitioners in sport alike will continue to discover new ways for

effective implementation. The results of this study showed two aspects of mindfulness (nonreactivity and observing) relating to lowered anxiety among athletes. The MAC approach to sports performance teaches a similar acceptance of emotions versus experiential avoidance (Gardner & Moore, 2007; Kabat-Zinn, 2003). This information could be useful for coaches who already use mindfulness training in their athletic program. By targeting these two facets of mindfulness, coaches and players may find even more benefit, especially in the area of sports injuries occurrence.

Bringing mindfulness practices into the arena of sports to training programs has already been shown to be effective (Gardner & Moore, 2012). This research shows that training athletes to practice mindfulness in everyday life and not only before a match or when in competition is helpful for practitioners and coaches in the arena of sport. This is because, unlike sports specific training, there are so many opportunities for mindfulness to be implemented and found useful in everyday life. As with anything, the more something is practiced the easier it gets. When an athlete begins to discover the benefits of mindfulness in their everyday life (e.g., acceptance versus experiential avoidance) (Hayes et al., 1999), one would assume that it would be easier to apply the practice in their sports life.

Similar to some of the existing literature, the study at hand also found somatic anxiety and worry to share a positive relationship with injuries. The findings in this study indicate that asking more questions about how mindfulness and other practices can help reduce somatic anxiety and worry would hold some potential benefit for the athlete/injury process. Certainly, coaches would do well to assess their athletes for these types of anxieties and to educate themselves on how it may impact injury occurrence. Athletes

reporting high somatic anxiety may well benefit from stretching even more than the average athlete. Sports programs would only benefit from providing their athletes with access to psychotherapy for addressing and coming up with plans for coping with and treating injuries and anxiety. Finally, educating coaches and trainers on the differences between cognitive and somatic anxiety and their impact on the injury process would be beneficial.

Limitations

This study included several limitations. Among these, perhaps the most limiting was the relatively small sample size of 95 participants and the fact that most of the participants were drawn from only one university. The recruitment method for collecting participants included direct requests from the coaches of the athletes at a university in the suburbs of Seattle, Washington, as well as three separate requests posted to the social utility web site, Facebook. Of the 95 participants, only 21 came from Facebook and the remaining came from the university. The size of the sample may have been limited because of the lack of a larger monetary budget for this study. Participants were given the chance to win only one of three \$35 Visa cash cards for their participation. The survey took an average of 20-30 minutes to complete. Most of the recruitment for this study took place during the end of the school year during which time students were preparing for and taking final exams. These factors may have limited the motivation for college students to participate.

Another potential limitation is the fact that the method of survey delivery was not administered in the presence of the principal investigator. One of the benefits of a live administrator includes the convenience of having someone to answer participant

questions as well as having someone available to describe the study in person in order to create motivation and buy-in among participants.

A larger sample size drawn from a larger variety of populations (i.e., other university athletic programs) might provide for a better test of potential relationships among mindfulness, anxiety, and time loss due to sports injuries. The absence of a significant relationship between mindfulness and sports injuries may be a sample-specific finding but may also be representative of the larger population. This study was unique in that no other study was found that utilized both a mindfulness and a sports anxiety scale in relation to the amount of time the athletes lost in competition rather than the number of injuries accrued (Ivarsson et al., 2015). More research efforts using these methods would be needed in order to determine if the results found in this study could be generalized among most athletes. Nonetheless, lack of evidence for a significant relationship between mindfulness and sports injuries here should not dissuade future examination of the impact of the mindfulness—a relatively new concept in western psychology—on sports injuries. Pioneers such as Gardner and Moore (2007), among many others (Baltzell et al., 2014; Brefczynski-Lewis et al., 2007; Farb et al., 2010; Gooding & Gardner, 2009; Kabat-Zinn et al., 1985) have made it clear that mindfulness certainly has utility in the arena of athletic performance, therefore this study should be replicated with larger samples, longitudinally, with more sports, and with athletes of all ages.

One challenge of this study was determining how to best measure injury as the dependent variable. Because many of the athletes reported experiencing injuries that would last for long periods of time, using the number of injuries as the dependent variable did not always offer an accurate representation of how impactful mindfulness

and/or anxiety was on a participant's injury occurrence rate. Rather than analyzing the number of injuries, it was decided to examine the amount of time spent on the sidelines due to injury in order to better determine the "amount of injuries" athletes experienced relative to their existing mindfulness and anxiety scores.

Future Directions

The finding that mindfulness did not show a strong relationship to time spent injured does not mean that future efforts to discover this relationship should be abandoned. Rather, because of the known impact mindfulness has been shown in the literature to have on anxiety, a predictor of injury occurrence, re-examining these variables in a larger, more comprehensive sample from a broader population of athletes would be worthwhile. Beyond this, future recommendations would include studying these variables prospectively among participants over a longer period of time so as to increase the amount of data regarding injury occurrence and the time lost as a result.

It was the purpose of this particular examination to retrospectively explore the relationship between levels of mindfulness and anxiety and how much time athletes spend on the sidelines injured. The above limitations (e.g., larger samples, longitudinally, more sports) offer some possibilities as to why the hypothesized relationships were not found. Further studies may do better to explore these variables experimentally rather than through correlational design. Because mindfulness is an experiential practice, developing a practical mindfulness curriculum that is applied regularly to an experimental group over a longer period of time (e.g., a full soccer season) may yield results similar or even more promising than Ivarsson et al. (2015).

Nonetheless, the findings in this study have prompted an inquiry into various

questions: Why is there a stronger relationship among male athletes between time out due to injury and levels of somatic anxiety and worry than there is among female athletes? If worry and somatic anxiety potentially lead to more injuries and time out due to injury in males, further effort exploring that which might mitigate these particular athletes' sports anxiety would prove to be useful in preventing sports absence. Unlike somatic anxiety, worry is a type of cognitive anxiety. Future recommendations would include isolating the presence of such cognitive anxiety in male athletes. Kleinert (2002) proposed a scale to measure an athlete's sports injury trait anxiety, which is based on the idea that athletes who worry about getting an injury tend to be injury prone. Future efforts may benefit from measures such as these as they specifically target worry in relation to the sports injury process.

Furthermore, the finding that specific aspects of mindfulness, such as nonreacting and observing, appear to be significantly related to state anxiety indicate that continuing to explore these two aspects specifically in the context of sports performance is warranted. As mindfulness continues to be utilized and examined in the arena of sport, learning about what practical aspects of mindfulness practice bolster nonreacting and observing skills may prove beneficial.

Conclusions

This study found no evidence of a relationship between mindfulness and time loss due to injury among collegiate athletes. Furthermore, while total anxiety in all athletes did not show a significant relationship with sports absence, somatic anxiety and worry alone were shown to have a significant positive relationship with injury specifically among male athletes. More specifically, male athletes who experienced anxiety in their

body and who worried about their performance and about letting others down experienced more time spent on the sidelines injured. Surprisingly, this study found that there was no strong evidence of a relationship between total mindfulness and total anxiety among collegiate athletes. However, exploratory findings show that athletes reporting higher ability for nonreacting and observing did report much less anxiety.

Further research into how mindfulness and sports injury relate to each other is certainly recommended among a larger sample over a longer period of time. Also, future examination into these variables may be most effective if the experiential practice of mindfulness is applied via an experimental design. Ultimately, this study has shown that, while mindfulness did not appear to predict the amount of time an athlete spent out of play due to injury, sport anxiety did. Therefore, because certain aspects of mindfulness were shown to be related to lower anxiety among athletes, it is worth continuing to explore ways in which mindfulness may be able to mitigate sport injury among athletes.

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Appendix A

Informed Consent

**The Relationship Between Mindfulness, Sports Injury Anxiety,
and Time Lost Due to Injury in Collegiate Athletes**

Consent Form

Northwest University

Tyson Hall

Purpose: You are invited to participate in a research study conducted by Tyson Hall, a psychology student in the Psy.D. program at Northwest University in Kirkland, WA. This study is being conducted as part of a dissertation to fulfill degree requirements. The purpose of this study is to better understand the aspects of sports injury occurrence and, specifically, to understand how mindfulness and anxiety related to this.

What is expected of you: If you agree to participate in this study, you will complete a questionnaire that will take around 20-30 minutes.

Risks and benefits: There are minimal risks associated with participation. You may feel uncomfortable answering some personal questions. Your information will be held in strict confidentiality. You will not be asked for any identifying information other than your sport and any injuries you may have had. No one will have access to this information except the primary researcher. **All responses are confidential:** The survey you will be completing is being hosted by the online website, www.docs.google.com/forms, which is a password protected service. **DO NOT** input your name on any of the response sheets. The benefit of taking part in this study is the opportunity to participate in the research process and contribute to research in the field of sport psychology. By participating fully in this study, you will be entered in a drawing for a chance to be one of three individuals who will win a \$35 Visa cash card.

Participation in this study is voluntary: In order to participate in this study, *you must be at least 18 years of age*. You may choose not to participate in this study at any time and for any reason. There will not be any negative consequences for you if you refuse to participate. You may refuse to answer any questions asked. You should keep this consent form for your records. By completing the survey, you are giving permission to use your responses in this research study.

Use of results: You will not get the results of your survey. The results from this study will be used in a doctoral dissertation, presented before a committee, and presented at a conference. All data forms will be destroyed by 12/31/2016.

Questions: If you have any questions about this study, contact Tyson Hall at 907-717-9877 or tyson.hall11@northwestu.edu. If you have further questions, please contact my Dissertation Chair Dr. Kevin Leach at 425-889-5248 or kevin.leach@northwestu.edu. You may also contact the Chair of the Northwest University IRB, James Huegel, at provost@northwestu.edu or 425-889-5237.

Thank you for your consideration of this request.

Tyson Hall, Psy.D. Student at Northwest University

Dr. Kevin Leach, Dissertation Chair and Faculty at Northwest University

Appendix B

Demographic and Injury Questionnaire

- 1) **Age (in years):** _____
- 2) **Sex:** M / F
- 3) **Year in School** (circle one): Freshman / Sophomore / Junior / Senior
- 4) **Marital Status:** Married / Single / Divorced
- 5) **Do you have dependents (children, grandmother, etc...) living in your household?** Yes / No
- 6) **Ethnicity:** (circle one) American Indian or Alaska Native / Asian / Black or African American / Native Hawaiian or Other Pacific Islander / White or Caucasian / Hispanic
- 7) **What is your primary sport?** _____
- 8) **What is your position?** _____
- 9) **How many years of experience do you have competing in this sport?** _____
 - a. Pre-collegiate _____
 - b. Collegiate _____
- 10) **How many injuries have you had during your collegiate career?** _____ (If none, skip to next questionnaire)
- 11) **While playing sports in college, how long have you been unable to participate in sports, including both intercollegiate competition and practices, due to injury acquired while playing sports?** (Please report all sets of dates out of sport due to injury. If you don't know exact dates, please estimate to the best of your ability. Example: "01/10/13 to 01/22/13 and 10/01/14 to 11/30/14")

- 12) **How many collegiate competitive events (matches, games) have you missed due to injury?**

Appendix C

Five Facet Mindfulness Questionnaire (FFMQ)

Please rate each of the following statements using the scale provided. Write the number in the blank that best describes your own opinion of what is generally true for you.

1 - never or very rarely true 2 - rarely true 3 – sometimes true
4 – often true 5 - very often or always true

- _____ 1. When I'm walking, I deliberately notice the sensations of my body moving.
- _____ 2. I'm good at finding words to describe my feelings.
- _____ 3. I criticize myself for having irrational or inappropriate emotions.
- _____ 4. I perceive my feelings and emotions without having to react to them.
- _____ 5. When I do things, my mind wanders off and I'm easily distracted.
- _____ 6. When I take a shower or bath, I stay alert to the sensations of water on my body.
- _____ 7. I can easily put my beliefs, opinions, and expectations into words.
- _____ 8. I don't pay attention to what I'm doing because I'm daydreaming, worrying, or otherwise distracted.
- _____ 9. I watch my feelings without getting lost in them.
- _____ 10. I tell myself I shouldn't be feeling the way I'm feeling.
- _____ 11. I notice how foods and drinks affect my thoughts, bodily sensations, and emotions.
- _____ 12. It's hard for me to find the words to describe what I'm thinking.
- _____ 13. I am easily distracted.
- _____ 14. I believe some of my thoughts are abnormal or bad and I shouldn't think that way.
- _____ 15. I pay attention to sensations, such as the wind in my hair or sun on my face.
- _____ 16. I have trouble thinking of the right words to express how I feel about things
- _____ 17. I make judgments about whether my thoughts are good or bad.
- _____ 18. I find it difficult to stay focused on what's happening in the present.
- _____ 19. When I have distressing thoughts or images, I "step back" and am aware of the thought or image without getting taken over by it.
- _____ 20. I pay attention to sounds, such as clocks ticking, birds chirping, or cars passing.
- _____ 21. In difficult situations, I can pause without immediately reacting.
- _____ 22. When I have a sensation in my body, it's difficult for me to describe it because I can't find the right words.
- _____ 23. It seems I am "running on automatic" without much awareness of what I'm doing.
- _____ 24. When I have distressing thoughts or images, I feel calm soon after.
- _____ 25. I tell myself that I shouldn't be thinking the way I'm thinking.
- _____ 26. I notice the smells and aromas of things.
- _____ 27. Even when I'm feeling terribly upset, I can find a way to put it into words.
- _____ 28. I rush through activities without being really attentive to them.
- _____ 29. When I have distressing thoughts or images I am able just to notice them without reacting.

- _____ 30. I think some of my emotions are bad or inappropriate and I shouldn't feel them.
- _____ 31. I notice visual elements in art or nature, such as colors, shapes, textures, or patterns of light and shadow.
- _____ 32. My natural tendency is to put my experiences into words.
- _____ 33. When I have distressing thoughts or images, I just notice them and let them go.
- _____ 34. I do jobs or tasks automatically without being aware of what I'm doing.
- _____ 35. When I have distressing thoughts or images, I judge myself as good or bad, depending what the thought/image is about.
- _____ 36. I pay attention to how my emotions affect my thoughts and behavior.
- _____ 37. I can usually describe how I feel at the moment in considerable detail.
- _____ 38. I find myself doing things without paying attention.
- _____ 39. I disapprove of myself when I have irrational ideas.

Appendix D

Appendix: Sport Anxiety Scale-2

REACTIONS TO PLAYING SPORTS

Many athletes get tense or nervous before or during games, meets or matches. This happens even to pro athletes. Please read each question. Then, circle the number that says how you USUALLY feel before or while you compete in sports. There are no right or wrong answers. Please be as truthful as you can.

<u>Before or while I compete in sports:</u>		Not At All	A Little Bit	Pretty Much	Very Much
1.	It is hard to concentrate on the game.	1	2	3	4
2.	My body feels tense.	1	2	3	4
3.	I worry that I will not play well.	1	2	3	4
4.	It is hard for me to focus on what I am supposed to do.	1	2	3	4
5.	I worry that I will let others down.	1	2	3	4
<u>Before or while I compete in sports:</u>		Not At All	A Little Bit	Pretty Much	Very Much
6.	I feel tense in my stomach.	1	2	3	4
7.	I lose focus on the game.	1	2	3	4
8.	I worry that I will not play my best.	1	2	3	4
9.	I worry that I will play badly.	1	2	3	4
10.	My muscles feel shaky.	1	2	3	4
<u>Before or while I compete in sports:</u>		Not At All	A Little Bit	Pretty Much	Very Much
11.	I worry that I will mess up during the game.	1	2	3	4
12.	My stomach feels upset.	1	2	3	4
13.	I cannot think clearly during the game.	1	2	3	4
14.	My muscles feel tight because I am nervous.	1	2	3	4
15.	I have a hard time focusing on what my coach tells me to do.	1	2	3	4

Appendix E

State Trait Anxiety Inventory

Read each statement and select the appropriate response to indicate how you feel right now, that is, at this very moment. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

	1	2	3	4
	Not at all	A little	Somewhat	Very Much So
1. I feel calm			1	2
2. I feel secure			3	4
3. I feel tense			1	2
4. I feel strained			3	4
5. I feel at ease			1	2
6. I feel upset			3	4
7. I am presently worrying over possible misfortunes			1	2
8. I feel satisfied			3	4
9. I feel frightened			1	2
10. I feel uncomfortable			3	4
11. I feel self confident			1	2
12. I feel nervous			3	4
13. I feel jittery			1	2
14. I feel indecisive			3	4
15. I am relaxed			1	2
16. I feel content			3	4
17. I am worried			1	2
18. I feel confused			3	4
19. I feel steady			1	2
20. I feel pleasant			3	4

SELF-EVALUATION QUESTIONNAIRE

STAI Form Y-2

Date _____

DIRECTIONS

A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number to the right of the statement to indicate how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

ALMOST NEVER
SOMETIMES
OFTEN
ALMOST ALWAYS

- 21. I feel pleasant 1 2 3 4
- 22. I feel nervous and restless 1 2 3 4
- 23. I feel satisfied with myself 1 2 3 4
- 24. I wish I could be as happy as others seem to be 1 2 3 4
- 25. I feel like a failure 1 2 3 4
- 26. I feel rested 1 2 3 4
- 27. I am "calm, cool, and collected" 1 2 3 4
- 28. I feel that difficulties are piling up so that I cannot overcome them 1 2 3 4
- 29. I worry too much over something that really doesn't matter 1 2 3 4
- 30. I am happy 1 2 3 4
- 31. I have disturbing thoughts 1 2 3 4
- 32. I lack self-confidence 1 2 3 4
- 33. I feel secure 1 2 3 4
- 34. I make decisions easily 1 2 3 4
- 35. I feel inadequate 1 2 3 4
- 36. I am content 1 2 3 4
- 37. Some unimportant thought runs through my mind and bothers me 1 2 3 4
- 38. I take disappointments so keenly that I can't put them out of my mind 1 2 3 4
- 39. I am a steady person 1 2 3 4
- 40. I get in a state of tension or turmoil as I think over my recent concerns and interests 1 2 3 4