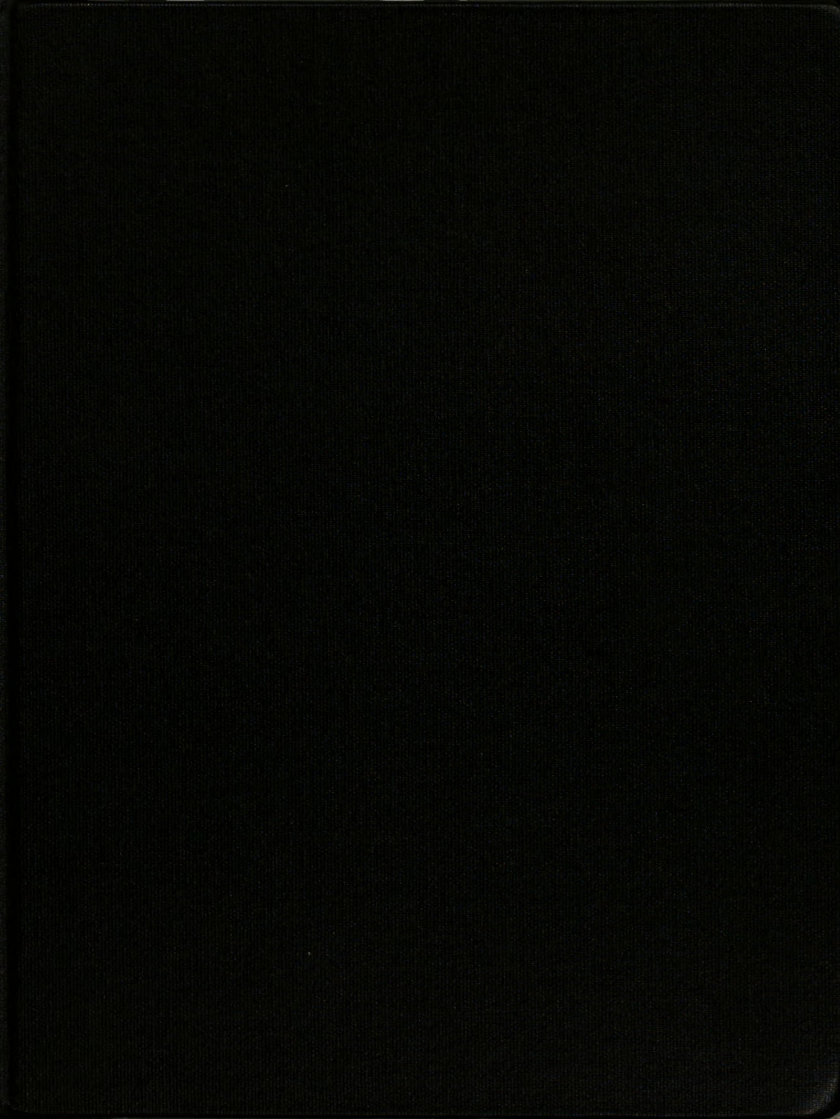






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**COGNITIVE AND EMOTIONAL POCESSES DURING
THE REHABILITATION OF SEVERE ATHLETIC INJURIES**

presented by

Dawn Kimberly Lewis

has been accepted towards fulfillment
of the requirements for

MS degree in Kinesiology

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**COGNITIVE AND EMOTIONAL PROCESSES
DURING THE REHABILITATION OF SEVERE ATHLETIC INJURIES**

By

Dawn Kimberly Lewis

A THESIS

**Submitted to
Michigan State University
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ABSTRACT

COGNITIVE AND EMOTIONAL PROCESSES DURING THE REHABILITATION OF SEVERE ATHLETIC INJURIES

By

Dawn Kimberly Lewis

This study assessed injured athletes' self-confidence, treatment confidence, and mood states during recovery, identified sources of social support, and compared the "Iceberg profile" of injured athletes to Morgan and Pollack's (1979) sample. Lowest levels of self-confidence were expected nearest the third practice after returning. Treatment confidence and mood state fluctuations were reported. Participants, five varsity NCAA Division I university student-athletes diagnosed with a severe injury, completed a confidence questionnaire and the POMS short form 6 times during assessment and were interviewed 3 times during recovery. Data analysis showed self-confidence increased from the onset of injury to the 7th practice. Treatment confidence was moderately high at onset of injury and increased by the 7th practice session. Changes in total mood states were found. In addition, fluctuations in anger, depression, and tension were reported. Similar, but depressed, "Iceberg profiles" in comparison to Morgan and Pollack's sample were found. Changes in confidence and mood states were attributed to factors such as injury type, length of recovery period, and issues pertaining to social support.

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DEDICATION

I dedicate this thesis to my family as a thank you for all your love and support. Mom you have always been a miraculous source of strength and a brilliant model. Your love and support throughout my life and during this extended time away from home has been invaluable. Daddy, look what your friendship and pervasive attitude has taught me. It is no wonder I only know how to move forward and upward. Grem (also known as Bridget), as far as big sisters go, you are *the queen of the household*. I hope someday I can be at least half as inspirational to you as you are to me. It is a debt I may never be able to repay. Latidra, thanks for the laughs little sis. Your beautiful smile and carefree ways challenge me to take a moment to have fun. Everyone should be lucky enough to have an *Aunt T* in their life. Finally, Nana, when I get tired and begin to doubt myself (as I often do), I remember how you knew never to worry about me. Everyday I carry the strength of your belief in me in my heart. I miss you more with every passing day...

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CHAPTER 1

INTRODUCTION

Overview of the Problem

More than 4 million Americans are seriously injured playing sports each year (Loudan, 1996). In fact, three sports alone - football, baseball, and basketball - injure more men in the age range of 15 to 24 than car accidents. Data collected internationally from emergency and casualty treatment centers show 4 - 16% of such cases resulted from a sport or exercise related injury (Uitenbroek, 1996). Although the reports presented by Loudan and Uitenbroek represent a combination of intramural, recreational, and elite athletes, the data on injury occurrence specific to college and elite athletes are no less alarming. Through use of The National Sports Injury Surveillance System, Zemper (1989) reported the overall injury rate of National Collegiate Athletics Association (NCAA) and National Association of Intercollegiate Athletics (NAIA) college football players was 45.27 per 100 athletes. A study of Irish international, county, and club sports revealed these athletes sustained an average of 1.17 acute and 0.93 overuse injuries per year and suffered the effects of sports injury for 52 days (Watson, 1993).

Female collegiate and elite athletes are also at risk. Ryan and McBride (1992) reported elite female soccer players experience a higher rate of injuries than a comparable group of male soccer players. An investigation of Olympic trial basketball players found a higher incident of knee injuries among women than among men (Ireland & Walls, 1991). Loosli, Requa, and Garrick (1992) found 82% of time-loss injuries

experienced by females on more than half of the NCAA top 15 ranked softball teams involved an upper extremity.

Injuries can significantly affect athletes both physically and psychologically. Injuries may prevent training from being carried out to its correct intensity, or restrict an athlete's range or intensity of movement. Limitations of performance, competition losses, or loss of team position may have serious psychological consequences for the injured athlete (Watson, 1993). The psychological reactions of athletes to injury are many and vary by individual. These reactions include, but are not limited to, denial, anger, frustration, depression, and grief. When athletes are unable to carry out the activities required by their sport, their sense of self-confidence may be diminished (Seff, Gecas, & Ray, 1992). Because of these emotional responses to injury, athletes may experience confusion and feelings of helplessness that may prove detrimental to the recovery process (Flint, 1993; Yukelson, 1986). However, Fisher (1990) has identified self-confidence as a primary component in the rehabilitation process. He further states that strategies promoting self-confidence will increase the likelihood of treatment adherence.

Extending research to include the examination of self-confidence during sport injury rehabilitation may have many benefits for the athlete. Because self-confidence is not concerned with the skills an individual possesses but with the judgments of what an individual can do with the skills he/she possesses (Bandura, 1977), identifying factors influencing self-confidence during rehabilitation may expose the negative cognitions shared by athletes who sustain a severe athletic injury.

Identification of the psychological needs and strategies for recovery are crucial to the rehabilitation process. Feelings of helplessness experienced during recovery can be overwhelming to injured athletes. The feelings of athletes that they have the ability to

take command (control) of a situation, such as the rehabilitation program, is an important aspect contributing to levels of self-confidence. Also important in the recovery process are feelings that a task can be accomplished successfully (perceived competence) and the athlete's willingness and capability to stay with a task (commitment). Strategies that promote competence, control, and commitment can increase the athlete's confidence in a successful recovery from injury and increase the likelihood of treatment adherence (Fisher, 1990).

The sportsmedicine team (doctors and athletic trainers) plays a critical role in the physiological recovery of injuries. However, their role in the psychological care of injured athletes is just as important (Danish, 1982; Gaunya & Hoerner, 1982; Johnson, 1991; Weiss & Troxel, 1986; Wiese & Weiss, 1987). Meeting the psychological needs of athletes may increase adherence to the rehabilitation program. The willingness of athletes to comply with the treatment program is dependent upon their perception of the diagnosis and treatment program prescribed for the injury. If athletes believe their injury has been misdiagnosed or they lack conviction in the treatment program's ability to bring about a desired outcome, the likelihood of treatment adherence decreases. To increase compliance, it is critical that athletes have confidence in the sportsmedicine team, the injury diagnosis, and the treatment plan (Johnson, 1991). Identifying issues that may interfere or enhance confidence in the treatment's ability to bring about a desired outcome can help sportsmedicine teams structure rehabilitation programs to meet injured athletes' psychological needs and increase compliance. Therefore, a purpose of this study was to assess athletes' confidence in the treatment they received for their injury. More specifically, were the sportsmedicine team, diagnosis of injury, prescribed treatment, and rehabilitation facilities sufficient to strengthen participants' expectancy to return to sport with an equal quality of performance acquired prior to injury?

The Role of Social Support

Social support involves a network of personal ties which serves to meet an athlete's needs for venting feelings, receiving reassurance, and improving communication. Social support providers, which include family, friends, coaches and teammates, also serve to reduce uncertainty during times of stress and aid in the mental and physical recovery of the injured athlete (Rosenfeld, Richman, & Hardy, 1989). Although social support has not been associated with rehabilitation from injury and its effect on self-confidence and outcome expectancy of rehabilitation within the literature, Samples (1987) and Wiese and Weiss (1987) expressed that effective communication between injured athletes and the sportsmedicine team is essential to the healing process. Providing precise information about the nature of the injury and the steps involved in rehabilitation can help an athlete gain confidence in the expected outcome of the recovery process. Whether or not the sportsmedicine team is a source of social support for injured athletes has not been addressed to date.

An athlete may also gain self-confidence in his/her ability to return successfully to an equal quality of play through emotional support from family, friends, teammates, and coaches. For example, family members and friends can boost an athlete's self-confidence by reminding him or her of past successes and emotionally challenging the athlete to do his or her best to overcome obstacles and setbacks encountered during recovery. The issues of who supports an injured athlete and the type of support provided was addressed in this study. Therefore, a second purpose of this study was to identify individuals that injured athletes in the study believe provided social support, the type of support these persons furnish, and how the support they offered was helpful to the athlete.

Self-confidence and Injury

Individual perception of self-confidence has been extensively researched as a determining influence in sport participation and performance achievement (Griffin, Keogh, & Maybee, 1984; Krane & Williams, 1987; Taylor, 1987). While there is a rich supply of information regarding self-confidence in sport found in the literature (Feltz, 1988), research specific to understanding the effects of injury on self-confidence in sport performance is lacking. To address this gap in the available literature, research designed to examine the levels of self-confidence, the factors influencing perceived self-confidence during rehabilitation, and the needs of injured athletes during the rehabilitation process is warranted.

Bandura (1977) uses the term “self-efficacy” to describe the conviction one has to execute successfully the behavior (i.e., sports performance) necessary to produce a certain outcome. Thus, self-efficacy can be considered as a situationally-specific self-confidence about one’s ability to rehabilitate an injury successfully. Therefore, for the purpose of this study, self-confidence will be defined as the strength of the belief or conviction an individual has in his/her ability to perform specific sport skills relevant to the progression of a regular practice session.

Athletes who sustain a severe injury requiring at least 7 days away from practice and/or competition will have many concerns when returning to play. Amongst these concerns are: (a) will the athlete be able to perform at a level of play equal to that achieved prior to injury, and (b) was the treatment and rehabilitation sufficient enough to prevent reinjury. Bandura (1977) defines these separate concerns as efficacy expectations and outcome expectancy. Efficacy expectation is the conviction (self-confidence) that one can successfully execute the behaviors (sport skills) required to produce the outcome (a quality of performance equal to that acquired prior to injury).

Outcome expectancy refers to the athlete's estimate (confidence) that a given behavior (the rehabilitation protocol) will lead to certain outcomes (i.e., sufficient recovery to perform successfully and to prevent reinjury). Bandura differentiates between outcome and efficacy expectations because an athlete can believe that the rehabilitation program is sufficient enough to prevent reinjury, but if the athlete entertains serious doubts about whether he/she can perform the athletic skills necessary for success, then a quality of performance equal to preinjury states may not be achieved when returned to sport.

Bandura's theory (1977) of self-efficacy has been extensively used for investigating self-confidence in sport and motor performance. According to this theory, self-confidence is derived from four principal sources of information: vicarious experience, verbal persuasion, past performance accomplishments, and physiological states. Self-confidence can be encouraged through observing or imagining others perform a task or behavior that the observer has never performed (Feltz, 1982). For example, modeling is a vicarious exercise that allows an athlete to gain information and form new behavioral patterns through observation (Flint, 1991). Since judgments about our capabilities are often comparative in nature, seeing someone similar to oneself perform a particular task or behavior can enhance the perception about our capacity to recreate the action (Bandura, 1977). Therefore, modeling can act as a catalyst to effecting a positive approach to the rehabilitation process. By observing the injured model, injured athletes gain knowledge about rehabilitation strategies for handling setbacks, and the confidence that, if others can recover from injury, so can they.

Verbal persuasion leads people into believing that they can cope successfully with what has overwhelmed them in the past (Bandura, 1977). It is widely used by coaches, teachers, and parents because of its ease and ready availability.

Unfortunately, verbal persuasion can include bogus performance feedback that may be

detected by an athlete. In addition, the credibility, prestige, and trustworthiness of the source of verbal encouragement plays a role in its persuasive influence. Because of these two factors, verbal persuasion is considered a weaker source for enhancing a sense of self-confidence.

Using vicarious experiences (i.e., modeling) as a positive influence on self-confidence is dependent upon the athlete's level of experience and the difficulty of the task. The stability of verbal persuasion, used as a technique encouraging confidence, is dependent upon the type of feedback given and personality of the source (i.e., coach or trainer) providing the information. Because of these factors, vicarious experience and verbal persuasion are generally considered to be weaker sources of self-confidence and outcome expectancy than performance accomplishments (Feltz, 1988).

Performance accomplishments are an especially influential source of self-confidence because they are based on personal mastery experiences. Because prior successes raise mastery expectations (Bandura, 1977, 1982), it could be assumed that injured athletes who have experienced successful injury rehabilitations and return to practice and competition should maintain confidence in their performance ability throughout the rehabilitation process. However, when the athlete is returned to practice and competition after recovery from a severe injury, attempts to perform as well as prior to injury may not be successful. After a number of practice sessions, failure to perform as well as prior to injury may lower the athlete's confidence in him/herself and in the outcome expectancy of the rehabilitation program.

The injured athlete's physiological state is another source of information that can affect perceived self-confidence in coping with injury. Bandura (1977) states that physiological (emotional) arousal affects behavior through the cognitive appraisal of the information conveyed by arousal (Feltz, 1988). For example, injured athletes may

interpret increases in their physiological arousal as a fear that they cannot perform acquired sport skills as well as they could prior to injury, whereas non-injured athletes may perceive the same state as being ready for competition. However, physiological sources of self-confidence are not limited to autonomic arousal. People use their levels of fatigue, fitness, and pain in strength and endurance activities as evidence of physical incompetence (Feltz, 1988). When returned to practice after recovery from injury, an athlete may experience movement limitations and pain which can be perceived by the athlete as an inability to perform as well as prior to injury. Beliefs about performance inability after recovery can decrease the athlete's confidence in him/herself as an athlete and in the treatment's ability to properly rehabilitate the injury. Therefore, the third purpose for this study was to assess athlete's self-confidence while they recover from a severe injury and return to practice. Because recovery from injury and confidence is influenced by verbal persuasion, vicarious experiences, prior recovery experiences (performance accomplishments), and physiological states, where all of the information from these sources may not be available until after the 1st practice session, it is hypothesized that athletes with a severe injury will report lowest levels of self-confidence prior to the 3rd practice session than at any other assessment point in the study.

Fluctuations in Mood States

Fluctuations in confidence are associated with changes in the physiological arousal (feelings of nervousness and tension) experienced by athletes who sustain an injury. The Profile of Mood States (POMS; McNair, Lorr, & Droppleman, 1992), designed to test "typical and persistent mood reactions to current life situations" (p. 1), was developed to measure six identifiable mood or affective states associated with physiological arousal: tension-anxiety, depression-dejection, anger-hostility, vigor-activity, fatigue-inertia, and confusion-bewilderment. Morgan and Pollock (1977) and

Morgan (1980, 1985), using the POMS to assess elite and college level oarsmen, wrestlers, and runners, found that high-level athletes scored below the population average on the negative psychological constructs (tension, depression, anger, fatigue, and confusion), but above the population average for the positively anchored construct (vigor). The authors concluded that positive mental health, which includes lower anxiety and higher psychic vigor, is a correlate of success in athletics. In support of Morgan's model, Gill (1986) reported that it is not surprising the negative mood patterns assessed by the POMS are inversely related to success in sport since identical states have been negatively related to success in most achievement situations (Horne, 1992, p. 46). Therefore, if injured athletes exhibit negative mood patterns (i.e., high tension, depression and anger, and low vigor) when assessed using the POMS during rehabilitation of severe injuries, then it is probable that their confidence will be low. Therefore, the fourth purpose of this investigation was (a) to assess changes and/or fluctuations in participants' mood state during recovery, and (b) to compare the mood state "Iceberg" profiles of injured athletes in this study to their non-injured peers described in Morgan and Pollack's (1977) study.

Because of the initial shock associated with sustaining an injury, athletes are expected to be anxious, confused, bewildered, angry, and tense immediately after the injury occurs. At the time of injury, and for some time shortly after, the injury's prognosis and proposed treatment (including time away from practice) may be overwhelming for athletes. Therefore, it is expected there will be a dramatic drop in the injured athlete's self-confidence to perform sport skills. As athletes continue the rehabilitation program and gain confidence in its ability to heal and prevent reinjury, the self-confidence of injured athletes in their ability to perform acquired skills is predicted to increase during the treatment period. However, when these athletes return to practice, shifts in self-

confidence are expected once again. To date, these perceived shifts in self-confidence have not been documented.

Attempts to perform as well as prior to injury may not be successful for the athlete returning from injury. The negative impact of repeated failures is likely to decrease the self-confidence developed through previous successful sport experiences (Bandura, 1977). In addition, how the returning athlete perceives unsuccessful and successful attempts at acquired sport skills may contribute to lowered self-confidence (Bandura, 1977, 1982). During the first and second practice sessions after receiving medical clearance to return to play, injured athletes will reserve judgments regarding their ability to perform acquired skills in order to test the effectiveness of the rehabilitation program. If recovered athletes discover something that appears intimidating during these initial practice sessions (i.e., pain, physical limitations, inability to complete tasks to their standards), then athletes' self-confidence will decline despite their successful performance (Bandura, 1982). Because of this correlation between self-confidence, past performance accomplishments, and physiological states, it is hypothesized the lowest levels of self-confidence in sport performance will be experienced by athletes nearest the third practice session after rejoining full practices with the team in comparison to assessments taken at other points during this study.

When athletes perceive the situational demands of injury and rehabilitation to exceed their coping resources (i.e., coping strategies and social support networks), increased physiological arousal (anxiety) and decreased self-confidence are likely to be experienced (Lazarus & Folkman, 1984). Factors such as support from teammates, reassurance of team position from coaches, the listening support and emotional care provided by friends and family members, and the information and instructions given by the sportsmedicine team have been identified as relevant to the emotional and physical

care of injured athletes (Danish, 1982; Evans & Hardy, 1995; Fisher, 1990; Flint, 1993; Johnson, 1991; Smith, Smoll, & Ptacek, 1990). If a profile similar to the Iceberg profile (Morgan & Pollock, 1977) exists and can be identified for shifts in self-confidence and outcome expectancy during rehabilitation of severe athletic injuries, then it is important to understand the distinct factors contributing to these changes (such as social support) at the specific assessment points where change occurred.

It is probable that athletes who sustain a severe injury during the playing season will manage to maintain and increase their self-confidence and outcome expectancy during rehabilitation and upon return to play. For instance, the injury may be severe but may not have occurred in an area of the body crucial to the execution of skills specific to the athlete's sport (i.e., a distance runner with a broken finger). The athlete may have a very strong social support system or interests outside of his/her sport that takes its place during the rehabilitation period. These factors, identified by injured athletes, which serve to enhance and maintain self-confidence and outcome expectancy during recovery may act as a form of evaluation of the sportsmedicine team, coaches, sport psychologists, and social supporters. As researchers, it is important to investigate both the positive and negative psychological factors associated with recovering from injury.

Need for the Study

The data obtained from the study can provide insight into the psychological needs of injured athletes by identifying changes in the level of confidence and the factors influencing these changes. Using the POMS to assess athletes' mood states and mood changes during rehabilitation can help identify levels of physiological arousal which may affect confidence. Factors which encourage and inhibit higher levels of confidence can be identified from the analysis of interview data. Information gained from interviews can help future athletes experience less anxiety when made aware that their

perceptions of self-confidence and treatment confidence during recovery are not unique to the individual and are often shared by others. Physicians, athletic trainers, and physical therapists can use the data to provide information about athletes' confidence in injury diagnosis and treatment procedures to structure rehabilitation programs to include measures to increase and maintain self-confidence across all periods of injury rehabilitation. Social supporters of athletes, such as coaches, parents, and teammates, can gain an understanding of the psychological and social needs of these athletes and learn how to assist in their rehabilitation. Data revealing levels of self-confidence at various points in injury rehabilitation may be useful in returning athletes to an equal or better quality of skill upon returning to sport.

Statement of the Problem

The purpose of this research study was (a) to assess athletes' level of self-confidence in their ability to perform specific sport skills relevant to a typical practice session during recovery and upon return to practice, (b) to assess athletes' confidence in the treatment they received for their injury, (c) to assess changes and/or fluctuations in participants' mood states during recovery, and (d) to compare the mood state "Iceberg" profiles of injured athletes in this study to their non-injured peers described in Morgan and Pollack's (1977) study, and (e) to identify individuals that injured athletes believe provided social support, the type of support those persons offered, and how the support was helpful to athletes' recovery and return to sport. Thus far, each of these areas have not been addressed directly within the sport psychology literature.

Hypothesis

Because recovery from injury and confidence is influenced by verbal persuasion (physicians, athletic trainers, and coaches), vicarious experiences (conversations with persons who have undergone similar therapies), prior recovery experiences

(performance accomplishments), and physiological states (perceived percent healed), where all of the information from these sources may not be available until after the 1st practice session, it is hypothesized that athletes with a severe injury will report lowest levels of self-confidence prior to the 3rd practice session than at any other assessment point in the study.

Research Questions

Did the sportsmedicine team, diagnosis of injury, prescribed treatment, and rehabilitation facilities available to the participants strengthen their expectancy to return to sport with an equal quality of performance acquired prior to injury?

What are the factors (such as social support) injured athletes attribute to enhancing and maintaining their self-confidence during recovery?

Are the psychological characteristics assessed by the POMS and associated with elite and college level athletes, as described by Morgan and Pollock (1977) and Morgan (1980, 1985) applicable to these athletes while they recover from severe athletic injuries?

Operational Definitions

Self-confidence: the strength of the belief or conviction an individual has in his/her ability to perform specific sport skills relevant to the progression of a regular practice session.

Severe injury: an injury which restricts sport participation for at least 7 days beyond the day of its occurrence.

Treatment confidence (outcome expectancy): the strength of belief an individual holds that (a) the sportsmedicine physicians and athletic trainers possess the knowledge to bring about injury recovery, (b) the injury has been diagnosed correctly, (c) the prescribed treatment will lead to the proper

rehabilitation of the injury, and (d) the rehabilitation facilities are properly equipped for the administration of the treatment.

Limitations/Delimitations

Because this study was an attempt to understand what happens to self-confidence during rehabilitation, histrionic occurrences between assessments are expected. Issues such as rehabilitation set backs, delays in progress, speed of recovery, recovery prognosis, social support, and treatment methods were all part of the recovery process and could not be controlled by the principal investigator. It was beyond the investigator's ability to control if, or when, these situations occurred.

Honesty in reporting levels of self-confidence by injured athletes threatened the validity of the research findings and could not be controlled by the principal investigator. However, this threat was minimized by emphasizing that the purpose of this study was to help future athletes, much like themselves, overcome their injuries. Participants were also reassured that their questionnaire and interview responses would be held confidential and reports of the research findings would not reveal their identity. To reduce the Hawthorne effect ["temporary changes that are due mainly to on-stage or testing effects or to the effects of novelty" (Agnew & Pyke, 1994, p. 159)] experienced by student-athletes, the athletic training staff administered the questionnaires to participants, but were not privy to participants' responses (see Chapter 3 for data collection methods). That is, because participants were familiar with the athletic trainers and accustomed to completing various forms and surveys under their supervision, student athletes were expected to be less likely to provide socially desirable answers. To further control for the Hawthorne effect, the in-depth interview sessions contained questions to gain further understanding of participants' thoughts and feelings addressed on their paper-pencil questionnaires.

Delimiting the study to the assessment of athletes who sustained a severe injury requiring at least 7 days away from practice led to a small sample of participants who met the criteria for inclusion in the study. Also, excluding less severe injuries from the study decreased the chances of achieving a sample size large enough to generalize the study's results to the target population. However, changes in self-confidence in an athlete's performance ability may not occur with minor or less severe injuries because they may not require the extensive treatment and time away from the sport commonly experienced with severe injuries. Investigations into minor or less severe injuries may be warranted, however it was not the current concern of this study. Therefore, for this study sample size has been delimited to athletes who sustain severe injuries.

The study was further delimited to college level athletes who sustained a severe injury while their sport was "in season." Student-athletes participating in varsity sports at a NCAA Division I university were chosen for the study. To qualify as a severe injury for this study, the injury's rehabilitation period required no less than 7 days away from practice. To reduce the chances of the principal researcher committing fraud in selecting participants for the study, diagnosis made by team physicians and the athletic training staff determined if the athlete had sustained an injury that met the study's criterion for inclusion. To increase the probability of achieving a sample size large enough to represent the target population, the researcher remained in close contact with the athletic training staff for notification of athletes who met the criteria for participation in the study.

Mortality or data loss is always a threat to studies such as this. Participation was voluntary and participants could decide to withdraw from the study at any time. Student-athletes may also graduate or withdraw from the university during the data collection period. In an effort to increase willingness to participate in the study, athletes were

assured of anonymity and confidentiality by taking steps to conduct assessments privately and discreetly. To avoid including participants who may graduate during the assessment period, the sport in which the injured athletes' participate must have had at least 2 weeks remaining to its season in order to meet criterion for inclusion in the study. In addition, athletes who sustained season-ending injuries were excluded from the study because they would not return to the sport in which the injury occurred within the data collection period.

Participants came from one institution. Therefore, results of this study may not be representative of the majority of student-athletes who sustain a severe injury. To gain greater understanding of post-injury levels of self-confidence during the rehabilitation of severe injuries, investigations whose sample comes from a number of institutions may be necessary in the future.

CHAPTER 2

REVIEW OF LITERATURE

Introduction

Many athletes judge their self-worth as a person by their athletic performance. Their self-esteem and self-respect depend on the outcome of competition (Danish, 1982). Deutsch (1985) asserts that athletics has a variety of meanings for the individual and society. Participation in sport and physical activity brings about enhanced health and well-being, physical mastery, positive self-concept, autonomy and self-control. Team sports can ward off feelings of loneliness and overcome feelings of helplessness by creating a sense of camaraderie. An athletic injury, even those that briefly halt participation, can interfere with the well-being and psychological health for the individual. It is no great surprise to find sport injuries have psychodynamic components that significantly affect an individual's emotional equilibrium and sense of well-being. Even injuries that are not serious or complicated from a physical standpoint may be as psychologically debilitating as more severe injuries especially if the injury has a special or symbolic meaning which shakes core adaptive structures (Deutsch, 1985). Therefore, it is essential that researchers explore the psychological response to athletic injury. The following section is a review of literature regarding athletes' emotional and psychological response to sport injury.

Theoretical Framework Part I: Stage Models

Rotella (1985), Lynch (1988), and Rotella and Heyman (1993) adapted Kubler-Ross' (1969) stages of death and dying to athletic injury. The typical responses to injury

often progress through stages similar to those of a person coping with the loss of a loved one. In particular, Rotella (1985) asserts that injured athletes progress through very similar and predictable stages experienced by the terminally ill. As an athlete becomes more aware of the extent of the injury, he/she advances through five stages: (1) disbelief, (2) anger, (3) bargaining, (4) depression, and finally, (5) acceptance and resignation.

Athletes commonly respond to injury by stating there is no damage (disbelief). As they are made more aware of the extent of their injury, athletes respond to their injury with anger, blame, self-condemnation, and irritability toward themselves and others. Soon, athletes begin to bargain. They begin to make deals with themselves and others regarding adherence to treatment and cognitively negotiate the outcome of such behaviors. At this time, athletes begin to experience a loss of identity. Depression, guilt, and anxiety are experienced when athletes feel they are letting down the team. These emotions can be associated with both team losses and lack of contribution to team success during their absence. Following this period of mourning, athletes become more able to move on, learn to put things into perspective, and accept the injury for what it is. The state of acceptance and resignation allows athletes to keep expectations flexible and goals realistic.

Brown and Stoudemire (1983) adapted Kubler-Ross' (1969) research to describe a three phase grief process. The researchers described the grief process as one which serves a psychologically adaptive function and usually progresses in a predictable manner. Three phases of the normal grief pattern were developed: (1) shock, (2) preoccupation with the deceased, and (3) resolution. Although Brown and Stoudemire's pattern of grief response was originally directed toward those who recently experienced

the death of a loved one, Pedersen (1986) applied these phases of grief to the emotional response to athletic injury.

Pedersen (1986) stated that Phase I, shock, begins immediately and can last approximately 14 days. This period serves to protect the athlete from experiencing the overwhelmingly painful reality of the injury. During this time, the athlete may deny the injury, experience a sense of being lost, dazed, and helpless. Physical responses such as crying, chest tightness, and nausea may also be manifested.

Next, according to Pedersen (1986), the athlete undergoes a period of intense preoccupation with the injury. Sadness, anger, and guilt are the overwhelming emotions experienced during this phase. Physical symptoms such as insomnia, fatigue, weight loss, and crying spells are characteristic of this period. The athlete may experience social isolation and introversion as well.

When the athlete regains interest and returns to activities, he/she is said to have entered the final stage of resolution and reorganization (Pedersen, 1986). Social contacts are re-established. However, the athlete may still experience residual emotions present during rehabilitation such as fear of reinjury, but these feelings tend to diminish in intensity over time.

Despite the popularity of stage models such as those described above in the applied literature, application of these models to research regarding athletic injury is not without flaw. Yukelson (1986) pointed out that individual differences exist among athletes with regard to the way they perceive and cope with injuries. Rotella (1985) noted that one athlete may perceive an injury as disastrous while another may interpret it as an opportunity to display self-discipline and courage to fight back. Pedersen (1986), herself, concluded that "a grief response is not a static state or an absolute predictable series of events or emotional responses," (p. 312). In fact, the idea of a

stereotypic pattern of emotional responses to injury has not held its validity to empirical scrutiny (Brewer, 1994).

Researchers (McDonald & Hardy, 1990; Smith, Scott, O'Fallon, & Young, 1990) did not find stage models to be an accurate description of athletes' psychological response to injury. Smith et al. (1990) conducted a longitudinal study involving 73 injured athletes. Using the Emotional Response of Athletes to Injury Questionnaire (ERAQ) and the Profile of Mood States (POMS), the researchers attempted to identify the emotional responses of athletes to injury and determine which responses might interfere with rehabilitation and necessitate psychological intervention. Although stage models like those of Kubler-Ross (1969) and Cassem and Hackett (1971) may provide general guidelines for identifying the emotional responses to terminal illness and treatment of coronary-health problems, Little (1969) demonstrated that psychological differences exist between athletes and non-athletes (Smith et al, 1990). This suggests that athletes may not respond to illness and injury in the same manner as non-athletes.

Smith et al. (1990) found severely injured athletes experienced intense emotional and mood disturbances immediately following their injuries and that this distress diminished over time. Elevated depression, tension, and anger in association with low vigor were evident until the second evaluation period, at which time mood disturbances decreased and vigor increased. In addition, no responses suggestive of denial were obtained on the ERAQ or POMS inventories. Therefore, Smith et al. concluded that no discrete stages of emotional response were identified. Their findings were consistent with those of McDonald and Hardy (1990) with one exception. McDonald and Hardy's interpretation of results suggests a two-stage pattern of emotional response to injury.

During a four week longitudinal study, McDonald and Hardy (1990) investigated the cognitive, affective, and behavioral responses of five injured athletes. Like Smith et

al. (1990), they found emotional responses during rehabilitation progressed from negative to a more positive state with regard to anger, depression, confusion, tension, and vigor. In addition, McDonald and Hardy suggested an alternative 2-stage grief response to injury to Kubler-Ross' (1969) 5-stage model. The first stage involved shock, and the second stage involved retreatment. Retreatment was considered a type of denial that involved the athlete returning to either illness or health. Although the McDonald and Hardy (1990) study had methodological weaknesses such as small sample size (Evans & Hardy, 1995), it is important to note that their findings were consistent with Smith et al.'s (1990) report that negative affective responses decreased as rehabilitation progressed (Brewer, 1994).

Another psychological variable that has been discussed within the injury literature is that of self-concept. In a review of models of adjustment to athletic injury, Brewer (1994) reported that a longitudinal study conducted by McGowan (1991) found significant post-injury decrements in self-concept relative to pre-injury self-concept in injured college football players. Athlete's self-concept remained significantly less positive for three weeks after injury and did not appear to improve thereafter. This suggests that the injured athletes failed to reach Kubler-Ross' stage of acceptance. A similar post-injury decrease in physical self-efficacy was found in a longitudinal study of college football players conducted by Connelly (1991).

Critics of the stage approach, such as Bugen (1977) and Brewer (1994), have suggested that the variability among individuals' grief response to athletic injury severely diminishes the utility of stage theories (Evans & Hardy, 1995). Stage models, as they relate to injured athletes, have not been supported by empirical research (Brewer, 1994). Pedersen's (1986) adaptation of Brown and Stoudemire's (1983) model of the grief response has been described as "plausible as a description of an athlete's

response to injury, although perhaps oversimplified" (cited in Wiese & Weiss, 1987, p. 322). According to Smith, Scott, O'Fallon, and Young (1990) and Quackenbush and Crossman (1994), no stages (either Kubler-Ross' or Cassem and Hackett's) were identified in their studies. In particular, denial was absent from the emotional responses of athletes in the studies. Perhaps the stage of denial occurs, but it is resolved much too quickly for quantitative assessment for injured athletes. Qualitative research, such as in-depth interviews, may reveal stages of grief and coping exist for injured athletes as well. It is also possible injured athletes' denial is not that the injury has occurred, but reflects their perceptions of the injury's type and severity. For example, a swimmer who separates his/her shoulder may believe an injury has occurred, but he/she may insist the muscles of the shoulder are intensely cramped and not believe the injury's severity until after confirmation from physical and medical tests. Although behaviors consistent with the various stages of these models have been observed in injured athletes, a common sequence of discrete emotional reactions to athletic injury has not been documented.

Theoretical Framework Part II: Cognitive Appraisal Models

Because stage models do not account for individual differences in response to athletic injury, cognitive appraisal models were developed to explain such differences. Models, such as Rotella's (1985) adaptation of Moss and Tsu (1977) and Moos' (1979) crisis model of coping with physical illness, Wiese and Weiss' (1987) adaptation of Weiss and Troxel's (1986) psychophysiological stress model, and Wiese-Bjornstal, Smith, Shaffer, and Morrey's (1998) adaptation of Andersen and William's (1988) model of athletic injury occurrence, have their roots in the literature on stress and coping, and consider injury the stressor. Each model proposes that the way in which the individual interprets (or appraises) an athletic injury determines the emotional response. The

emotional response is thought to affect behavioral outcomes during rehabilitation (i.e., adherence to treatment guidelines).

Moos' (1979) crisis theory was developed through a concern with the manner in which people cope with important life crises (Rotella, 1985). This theory has been influenced by four intellectual developments: (1) evolution and its pertinence for individual adaptation, (2) human motivation growth theories, (3) a life-cycle approach to human development, and (4) the study of coping behavior under extreme stress. Because athletes are incapable of remaining in an extreme state of disequilibrium, injured athletes will search for balance both cognitively and physically during the crisis period. The equilibrium achieved will either be positive and growth oriented or negative and self-defeating (Rotella, 1985).

A conceptual framework for understanding the life crisis of athletes facing serious injury and, with modification, treating all injured athletes was developed by Moos and Tsu (1977) and Moos (1979). This paradigm implies that injured athletes' interpretation of the injury's significance establishes basic adaptive tasks to which various coping skills can be applied. Personal characteristics, illness-related factors, and social environment significantly influence athletes' cognitive appraisal of the injury, perceptions of tasks required to overcome injury, and selection of coping skills relevant to their recovery. These three factors are learned and should be taught to all injured athletes because they provide athletes with the opportunity to gain self-control over the phases of rehabilitation which they are capable of controlling (Rotella, 1985).

Weiss and Troxel's (1986) psychophysiological stress model, which was later simplified by Wiese and Weiss (1987), described the stress response as a 4-tier process. First, a situation or stressor, the injury, occurs which places a demand and/or constraint on the body to adapt. In response to the injury, the athlete engages in

cognitive appraisal of the stressor and his/her ability and personal resources available to cope with the injury. At this time, the injured athlete evaluates and interprets the extent of the positive and negative effects of the injury (i.e., threatening or non-threatening), and the extent of the demands involved with rehabilitation and recovery.

Third, an emotional response manifested as psychological changes (i.e., attention narrowing, mood disturbances), physiological arousal (change in heart rate and blood pressure) result from the athlete's cognitive appraisal of the injury. It is important to note emotional reactions to psychological and physical changes at this stage often cycle back to influence the athlete's cognitions about the injury (Wiese & Weiss, 1987). For instance, increased anger and anxiety over the injury may lead to increased muscular tension which may interfere with injury recovery. On the other hand, lack of physical progress may increase frustration and tension while vigor decreases.

The fourth step in the stress process is the consequences of the athlete's behavioral, psychological, and health-related responses due to his/her appraisal of the injury. For example, an athlete who interprets the injury as a severe threat to his/her athletic career, may experience chronic tension, anxiety, and depression, and may engage in behaviors counter-productive to the healing process (e.g., lack of compliance to rehabilitation program).

The model produced by Weiss and Troxel (1986) is attractive within the field of study because, first, it views stress as a process where situational demands interact with the athlete's interpretation (appraisal) of the situation. In addition, personality and motivational variables are factored at each of the four steps of the stress process (Smith & Smoll, 1982). Second, implications for intervention strategies to minimize psychophysiological disturbances/distress by focusing on certain steps in the stress process are made clear by the model's diagram (Weiss & Troxel, 1986).

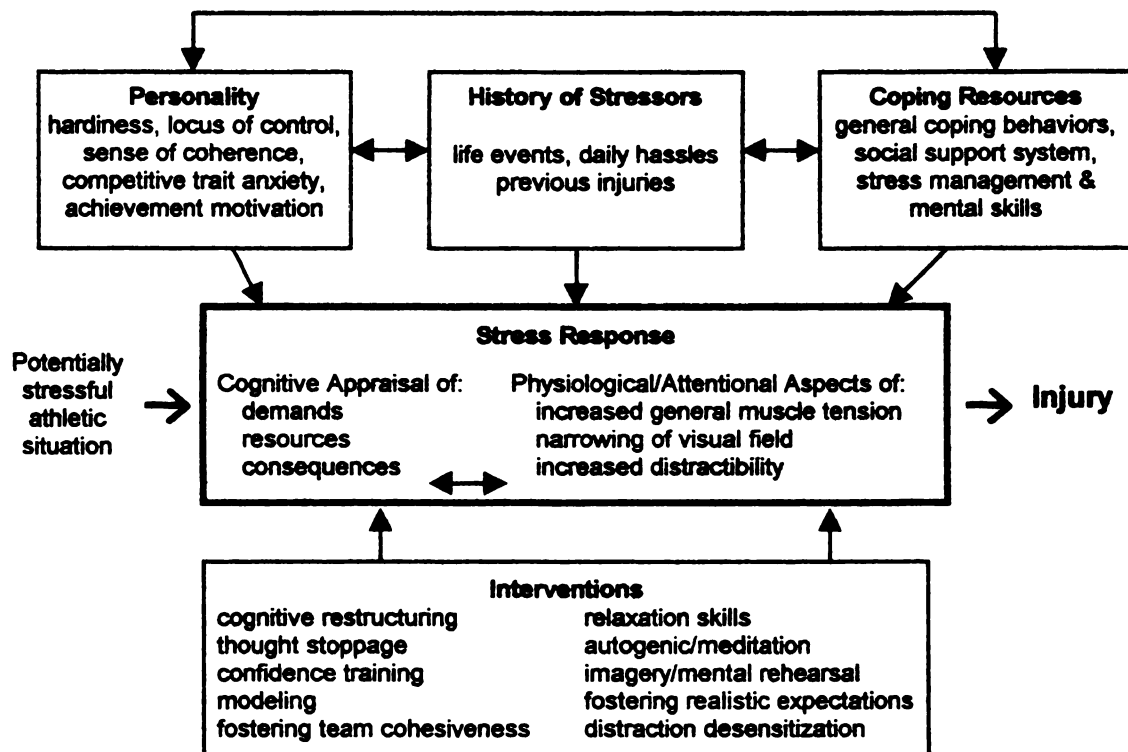
A third model of cognitive appraisal was developed by Wiese-Bjornstal and Smith (1993) which extended Andersen and Williams' (1988) model of athletic injury occurrence to include the post-injury phase. Both models were later revised (Wiese-Bjornstal, Smith, Shaffer, & Morrey, 1998; Williams & Andersen, 1998).

Andersen and Williams' (1988) theoretical model of stress and athletic injury proposed a framework for the prediction and prevention of stress-related injuries (see Figure 1). The model's stress response core is a bi-directional relationship between the athlete's cognitive appraisal of a situation (stressful or non-stressful) and the physiological/attentional aspects of stress. In the sport setting, an athlete interprets the demands of the competition or practice situation, decides if he/she is able to meet those demands, and identifies the possible consequences of success or failure. According to the model, personality characteristics (i.e., hardiness, achievement motivation, competitive trait anxiety), history of stressors (i.e., life events, daily hassles, injury history), and coping resources (i.e., social support system, general coping behavior) act in combination or in isolation to the stress response. Researchers hypothesized that athletes with a history of many stressors, personality characteristics which intensify or contribute to the stress response, and few coping resources will interpret a situation as more stressful and exhibit greater psychophysiological disturbance than athletes with an opposite psychosocial profile (Williams & Andersen, 1988). Increased risk to injury is suggested to be caused by increased stress reactivity to the severity of the stress response.

Williams and Andersen (1998) revised their stress-injury model with a few, but minor, modifications (see Figure 1). First, they contend that the model, as it stands, is probably most appropriate for acute injuries. However, for other types of injuries, the causes and mechanisms are already known. For example, overuse injuries are caused

by overuse and are not mediated by mechanisms within the stress response. Second, because researching the medication history and practices of athletes posed too many problems, the medication variable under the coping resource section of the model has been removed. Finally, personality variables that have been linked with injury outcome (i.e., negative mood states, absence of positive state of mind) also seem tied to coping resources (Fawcner, 1995; Williams, Hogan, & Andersen; 1993). Therefore, a bi-directional arrow between personality and coping resources has been added to the original model. Bi-directional arrows between personality and history of stressor and between coping resources and history of stressor have also been added "because the stressors people experience do affect how they develop and characteristically respond to self and others," (Williams & Andersen, 1998, p. 21).

Figure 1. Revised Stress and Injury Model (Williams & Andersen, 1998)



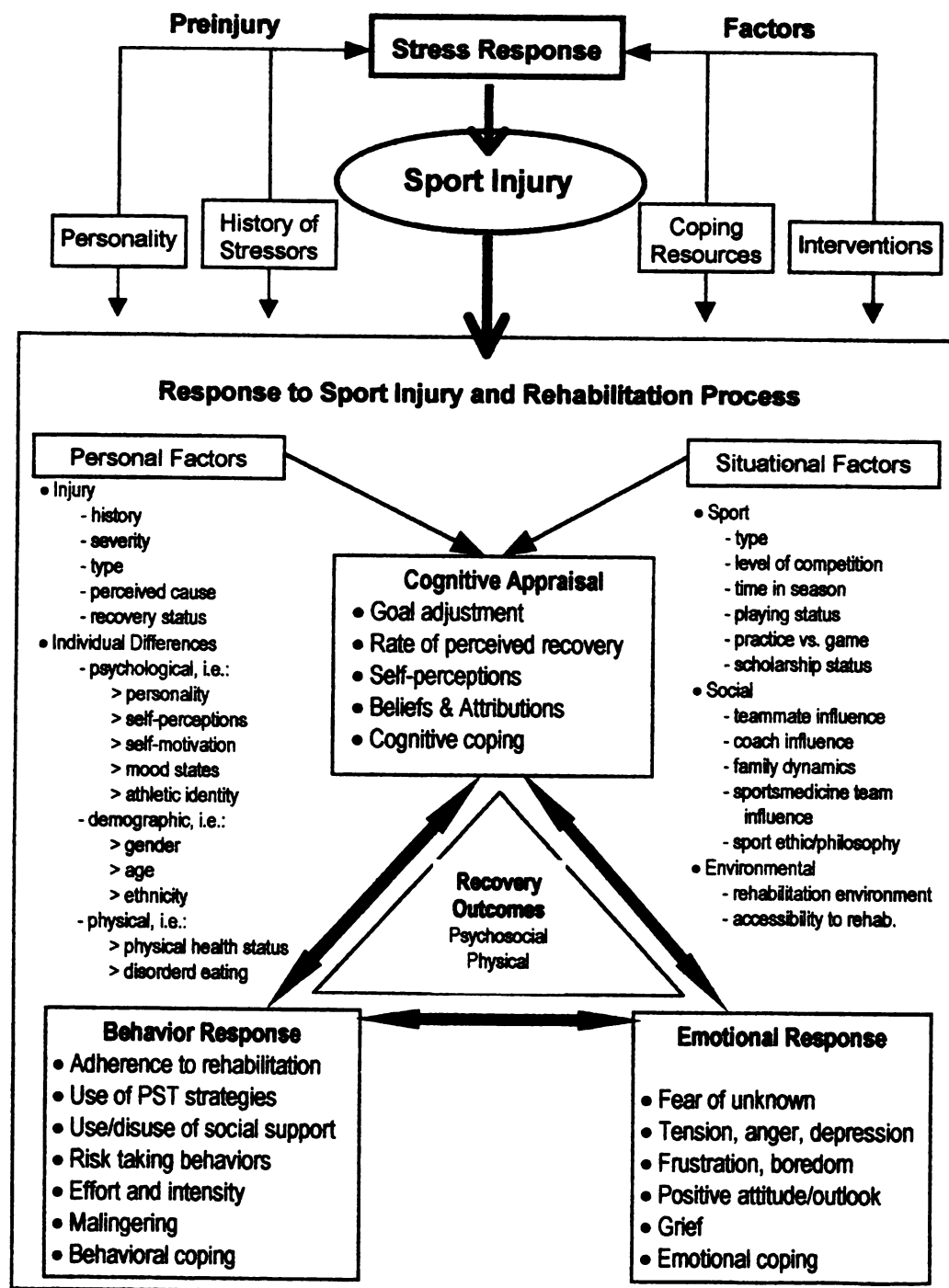
To better understand the psychosocial impact of athletic injury, Wiese-Bjornstal and Smith (1993) presented a post-injury response model that extended the pre-injury model of Andersen and Williams (1988). Wiese-Bjornstal and Smith assert that the precursors to athletic injury (personality, stress history, and coping resources) impact on the post-injury responses as well. For example, Smith, Smoll, and Ptacek (1990) found injured athletes who experience high stress, but lacked coping skills, will not have pre-injury issues resolved by the time they receive post-injury counseling. In addition, pre-injury stress and lack of coping ability may amplify post-injury psychosocial and physiological disturbances.

The extended model identifies some of the psychosocial factors that influence post-injury cognitions and emotions (see Figure 2). Key aspects of this model relate to the mediating role of (1) injury characteristics, (2) sport-specific situational factors, (3) interaction with the sports medicine team, and (4) individual differences, and their resultant cognitive, emotional, and behavioral responses of the injured athlete, which affect recovery and response to recovery setbacks.

It is important to note that Wiese-Bjornstal and Smith (1993) used bi-directional arrows between the cognitive, emotional, and behavioral responses. These responses to injury may signify that: (1) they continually change during the healing process; (2) only emotional and behavioral responses directly influence recovery; (3) recovery setbacks directly influence the cognitive responses and recovery; and/or (4) only the cognitive response to setbacks and emotional and behavioral responses prompt re-evaluation of injury severity, sport-specific situations, sports medicine team, and individual differences. The authors did not offer an explanation or examples applied to the sport setting for such developments within the post-injury model at the time of

publication. However, Wiese-Bjornstal et al. (1998) state that the conceptual model was “derived from a deductive analysis of existing empirical research,” (p. 48).

Figure 2. Integrated Model of Psychological Response to Sport Injury and Rehabilitation Process (Wiese-Bjornstal et al., 1998)



Brewer (1994) offers this explanation for gaps within cognitive appraisal model research,

"Exploration of cognitive appraisal models of emotional adjustment to athletic injury is in its infancy. The utility of cognitive appraisal models has been strongly demonstrated in other areas of psychology (Lazarus & Folkman, 1984). Although most studies have used retrospective and/or cross-sectional research designs to examine the claims of cognitive appraisal models in the domain of athletic injury, research findings to date suggest considerable promise for an approach that examines the joint influence of personal and situational factors on psychological responses to injury," (p. 93).

In response to Brewer's (1994) and Evans and Hardy's (1995) review of stage models mentioned within this literature review, Wiese-Bjornstal et al. (1998) maintain that the cognitive appraisal and grief process (stage) models are not mutually exclusive. The group surmised that the grief process models could be "subsumed" by a broader integrated stress process model. The new model postulates "that pre-injury (Andersen & Williams, 1988; Williams & Andersen, 1998), and post-injury (Wiese-Bjornstal & Smith, 1993) factors influence psychological response, that psychological response can and does change over time in a dynamic way, and that recovery - both physical and psychological - is the process outcome," (Wiese-Bjornstal et al., 1998, p. 48). Personal and situational factors are continually in the background and exert their influence throughout the dynamic process. Bi-directional arrows demonstrate the dynamic nature of the recovery process. Although cognitive appraisal predominately affects emotions and behavior, influences in the reverse direction are possible.

Summary. Feltz (1987) asserts that the growth in our understanding of sport behavior (and in injury behavior) has been slow. Borrowing theoretical models from general psychology and their application, with modifications, to sport and injury behavior has not been successful in describing and predicting athletes' psychological and emotional response to injury. In particular, grief/stage models have not been supported

by empirical research (Brewer, 1994) and have been described as oversimplified (Wiese & Weiss, 1987). Because of this, some leaders in sport psychology have called for the development of theories and conceptual frameworks specific to sport and athletic injury behavior. In particular, sport specific theories such as Rotella's (1985) crisis model, Andersen and Williams (1988) and Williams and Andersen's (1998) model of athletic injury occurrence, and Wiese-Bjornstal et al.'s (1998) integrated psychophysiological stress model, have significantly contributed to our understanding of athletes' cognitive and emotional response to injury and how these responses impact athletes' rehabilitation and return to sport.

Cognitive and Emotional Response to Athletic Injury

Theoretical frameworks such as those mentioned earlier have prompted a multitude of research studies designed to understand the cognitive and emotional response to athletic injury. Although some research studies were designed to directly support or extend a theoretical perspective (Quackenbush & Crossman, 1994; Smith, Scott, O'Fallon, & Young, 1990), many studies were conducted to gain a better understanding of athletes' emotional and psychological response to athletic injury (Evans & Hardy, 1995; Gould, Udry, Bridges & Beck, 1997a, 1997b; Leddy, Lambert, & Ogles, 1994; Quackenbush & Crossman, 1994; Smith et al., 1990; Smith, Stuart, Wiese-Bjornstal, Milliner, O'Fallon, & Crowson, 1993). Because the actual emotions experienced after injury must be understood before an injured athlete can undergo successful comprehensive rehabilitation, the following section will review research conducted relevant to this area of study, including their rationale, methods, and conclusions.

Review of sport-specific research begins with Smith et al. (1990) who desired to determine the presence, type, magnitude, and time course of the emotional response of

athletes to injury and identify those responses that might interfere with rehabilitation and require psychological intervention. To assess these phenomena, seventy-three (50 male and 23 female) injured athletes 12 to 54 years of age completed the Emotional Responses of Athletes to Injury Questionnaire (ERAIQ) and the Profile of Mood States (POMS) at the time of injury occurrence and at two-week intervals until return to full participation in sport.

Comparison of POMS scores by sex, age, and severity of injury found no gender (sex) differences and only for anger were age groups significantly different with younger athletes more angered than older athletes. Comparison of three severity of injury groups (based on the duration of time the athlete was unable to participate in sports) revealed that the most severely injured athletes showed the greatest mood disturbances. Smith and her colleagues (1990) found athletes' perceptions of the severity of the injury and their perceived rate of recovery seemed to influence their emotional responses. Not only did the most severely injured athletes exhibit a greater mood disturbance, but they also failed to show significant improvement in mood until one month after the injury.

Because pre-injury and post-injury mood states were not directly compared in their 1990 study, post-injury mood disturbances could not be attributed directly to the effect of injury. Therefore, Smith et al. (1994) conducted a follow-up study to determine the following: (1) if differences are evident between pre-injury and post-injury mood state, (2) if the severity of the injury influences mood state or self-esteem, (3) if mood state and self-esteem differed at various levels of participation within the same sport, and (4) if mood state and self-esteem differed between gender or between athletes in different sports. Thirty-six participants (31 male, 5 female) from a variety of sports

completed the ERAIQ, POMS, and The Rosenberg Self-esteem Inventory at their pre-season team meetings and at various times after injury occurred.

The researchers found significant differences between certain pre-injury and post-injury mood states of competitive athletes - specifically, depression, anger, and vigor subscales of the POMS. Further statistical evidence lead Smith and her colleagues (1994) to conclude that pre-injury mood disturbance was unlikely to have contributed to either the occurrence of injury or the post-injury mood disturbance. Therefore, the significant post-injury increase in depression and anger, and decrease in vigor, are most likely related to the injury itself. Injured athletes also exhibited lower post-injury fatigue scores than their pre-injury value which may have been due to the stress of pre-season conditioning and tryouts experienced prior to injury. Necessary rest and decreased energy expenditure required during injury recovery are possible explanations for the decrease in fatigue after injury.

Similar to their earlier findings (Smith et al., 1990), severity of injury was found to be the most predictive of post-injury depression. Restriction from and deprivation of benefits of participation in sports was longer for severely injured athletes than any other group in the study. The researchers proposed that missing training, fun, competition, opportunities for achievement and scholarship, and facing loss of livelihood were consequences of injury that may affect the post-injury response. Seff, Gecas, and Ray (1992) propose that pain associated with injury and recovery may be related to post-injury depression. They state that activities performed prior to injury, and produced positive effects, are accompanied or followed by pain after injury and during recovery. The pain experienced during recovery reduces positive reinforcement. By reducing his/her range of activities to avoid pain, the patient [athlete] reduces access to resources of pleasure and becomes entrapped in a cycle of depression and pain" (p. 585). These

explanations for post-injury depression support Wiese-Bjornstal and her colleagues' (1998) assertion that the response to injury is a dynamic process necessary of great attention.

Differences in level of participation within the same sport, gender, and between athletes in different sports were also analyzed by Smith et al. (1994). Significant differences within these areas were not found. In addition and of equal importance, no significant pre-injury and post-injury differences were found on the Rosenberg Self-esteem Inventory. This is not consistent with Chan and Grossman's (1988) report which found differences in self-esteem measures of injured and non-injured runners. However, it is important to note Smith and her colleagues' study used a within-subject, repeated measure design whereas Chan and Grossman analyzed between-subject variance of self-esteem.

While researchers have assumed that, following injury, athletes experience predictable psychological reactions such as depression, anxiety, and impaired self-esteem (Chan & Grossman, 1988; Crossman, 1985; Smith et al., 1990; Smith et al., 1993), several methodological problems limit the strength and ability to generalize their findings. For instance, with the exception of Smith et al. (1993), these studies used post-injury designs where pre-injury data were not available for comparisons. Smith et al. (1990) used college normative data, rather than non-injured athletes, for a comparison group, and Chan and Grossman's (1988) sample was limited to minor ankle and knee injuries. Because of these methodological concerns, Leddy, Lambert, and Ogles (1994) directly investigated the psychological effects of injury on elite level athletes. Specifically, assessments were taken both prior to and after injury. Athletes were from ten different sports, and instruments appropriate for and specific to the

phenomenon under investigation were used to examine the severity of psychological disturbances.

Leddy and his colleagues (1994) assessed 343 male collegiate athletes competing at a Division IA university. The athletes' ranged from 17 to 26 years of age. Participants completed the Beck Depression Inventory (BDI), The State-Trait Anxiety Inventory (STAI), The Tennessee Self-Concept Scale (TSCS), and a demographic and training questionnaire prior to injury (pre-test), after injury (post-injury), and at a follow-up session. Their research findings suggest that high-level athletes are vulnerable to emotional reactions following injury including increased depression and anxiety and reduced self-esteem (similar to Chan & Grossman, 1988). Injured and recovered athletes displayed significantly higher levels of depression and state-anxiety than non-injured athletes. At the same time, injured and recovered athletes exhibited significantly lower total and physical self-esteem scores following injury than non-injured athletes. While many of the injured athletes had mood disturbance in the mild range, 12% of the injured and recovered athletes had BDI scores that reflect intensities of depression symptoms similar to clients who receive outpatient treatment for their depression. Within the discussion, Leddy and his colleagues offer suggestions for helping injured athletes overcome psychological disturbances. Their suggestions will be discussed in the following section of this literature review.

Quackenbush and Crossman (1994) launched an investigation to explain the emotional response experienced by athletes during four periods of athletic injury (initially, the following day, during rehabilitation, and when returning to practice). They found frustration was apparent at each period and gradually decreased as the athletes continued through recovery. At the time of injury, athletes were similarly frustrated, angry, and discouraged, but male athletes tended to report more irritability, while female

athletes tended to be more cooperative, optimistic, and hopeful. Male athletes were more angry and/or irritable the day following injury onset, while their female counterparts were frustrated and miserable. Discussion of the research findings regarding the third period (during rehabilitation) were not mentioned in the write-up. However, the researchers found that in the fourth period, female athletes displayed more positive signs of returning to practice than male athletes.

Methodological considerations discussed previously in this literature review are of concern for Quackenbush and Crossman's (1994) study. First, the small, heterogeneous sample (N=25) used in the study creates issue with the ability to generalize findings to a specific athletic population (recreational versus elite athletes). Secondly, because of the small sample size and disproportional number of male (N=16) and female (N=9) participants, the ability to generalize gender differences is weak. Third, psychometrically sound inventories of assessment were not reportedly used in this study. Finally, there is concern within the field of sport psychology regarding the reliability of retrospective reports (Brewer, Van Raalte, Linder, & Van Raalte, 1991). Although Quackenbush and Crossman's research methods may require modifications and improvements, their findings contribute to and have been found elsewhere within the injury rehabilitation and sport psychology literature.

Recently, a series of interrelated articles based on the findings from an in-depth investigation focusing on the psychology of injuries among skiers on the U.S. team surfaced in the sport psychology literature (Gould et al., 1997a; Gould et al., 1997b; Udry, 1997; Udry, Gould, Bridges, & Beck, 1997). Because of their interrelationship, reviewing each study's research methods individually will be tedious and redundant. However, it should be noted that the studies employed a variety of research tools (the POMS, the Social Support Inventory (SSI), the Coping with Health and Injury Problems

questionnaire (CHIP), and in-depth interviews) to assess psychological and social constructs of interest to their studies. Their research findings are presented below.

Udry et al. (1997) examined the psychological reactions of elite athletes who experience season-ending injuries and the potential benefits athletes derived from their injuries. First, analysis of interview data revealed injured athletes attempt to determine the extent of their injuries, however, each individual must process injury-relevant information before they respond emotionally. Furthermore, differences in the length of time athletes spent processing injury-relevant information may account for variability in athletes' emotional response to injury. Secondly, they found athletes felt they grew from their injury experience in positive ways. These "secondary gains" were categorized as (a) personal growth (i.e., clarification of priorities), (b) psychologically based performance enhancement (i.e., increased mental toughness), and (c) physical/technical development (i.e., skied technically better and smarter).

Udry (1997) determined that instrumental coping efforts (pro-active attempts to alleviate the source of stress or discomfort through activities such as finding out more about a health condition and/or listening to advise of health care providers) was the coping strategy utilized most throughout recovery. Secondly, the type of coping strategy (instrumental, palliative, negative, distractive) used by athletes changed/fluctuated at different assessment points of the study. Third, injured athletes' perceived satisfaction with their social resources remained relatively constant throughout their recovery. Finally, the researcher found in partial support for her hypothesis that instrumental coping is positively associated with higher levels of adherence to rehabilitation, whereas palliative coping (engaging in a variety of self-help activities to alleviate the unpleasantness of a health problem or provide a soothing effect) is associated with lower levels of adherence.

Gould et al. (1997b) wanted to identify specific stress sources in elite skiers who sustained season-ending injuries and compare stress source differences between successful and unsuccessful post-injury performers. A wide variety of stress sources were found (i.e., shattered hopes and dreams, fear of reinjury, isolation, physical activity, uncertainty of the medical diagnosis). However, the largest stress source dimension noted by the researchers were psychological and social concerns. "For example, stress sources such as lack of (or inconsistent) contact with team, distractions, feelings of inadequacy, impatience, fear, and doubting/questioning were identified. What is ironic about these findings is that when most athletic personnel think of athletic injury, physical concerns come to mind" (p. 373). Secondly, comparison of successful and unsuccessful recoverers revealed unsuccessful recoverers reported less attention and empathy from others, more negative relationships with others, and more physical concerns (i.e., poor performance). On the other hand, but not far removed from their counterparts' feelings, athletes who successfully recovered and returned to sport were more likely to report isolation.

Finally, Gould et al. (1997a) revealed two significant findings. First, the coping strategies used by skiers were adaptive (versus maladaptive). Skiers reported driving through (i.e., did things as normal, and set and worked toward goals), managed emotions and thoughts (i.e., kept positive focus, dealt with and expressed emotions), and sought and used social resources. Secondly, analysis of gender differences revealed female and male skiers differ in several ways. While female athletes cited personal determination motivation, distracting self by keeping busy, and sought social support more than males, male athletes cited 'set and worked toward accomplishing goals' more often. Several limitations including issues related to sample size, the use of retrospective designs, and the inability to control for injury severity, and future directions

for study within this area were discussed by the researchers throughout the series of articles.

When investigating the cognitive and emotional response to injury, it is also important to consider the type of injury and how it may affect the athlete. Shuer and Dietrich (1997) administered the Impact of Event Scale to 280 college athletes with injuries (134 with acute injuries, 117 with chronic injuries). On the Intrusion subscale of the Impact of Event inventory, athletes with a chronic injury scored in the range of those who had experienced natural disasters, but scored significantly higher on the Avoidance/Denial subscale. Their Avoidance subscale scores were similar to those of a group of orthopedic patients who required hospital admission with surgical fixation. Furthermore, athletes' with chronic injuries avoidance behavior did not significantly decline in score with increased injury duration (i.e., 7 days, 30 days, >365 days). This led the authors to conclude that "although some attention has been focused on psychiatric intervention for acutely injured athletes or those who have undergone surgical treatment, the psychological needs of athletes struggling with chronic injuries also appear to merit consideration," (p. 108).

Providing further support for Shuer and Dietrich's (1997) findings, Wasley and Lox (1998) reported differences in measures of self-esteem and coping strategies of athletes with acute versus chronic injuries. They compared the Rosenberg Self-esteem Inventory and Ways of Coping Questionnaire responses of six athletes with acute injuries to the responses of six athletes with chronic injuries. Similar to Shuer and Dietrich, Wasley and Lox found that athletes with chronic injuries scored higher on the Escape/Avoidance and lower on Seeking Social Support than athletes with acute injuries. Athletes also scored more negatively on self-esteem than acutely injured

athletes. These results further reinforce that the type of injury (acute vs. chronic) may differentially affect self-esteem and coping behavior.

Summary. Research examining the cognitive and emotional response of athletes to injury has revealed that injury severity, perceptions of severity, and perceptions of healing rates influence athletes' emotional response to injury and recovery (Smith et al., 1990). Athletes are vulnerable to emotional reactions following injury including increased depression, anxiety, and frustration, and reduced self-esteem (Chan & Grossman, 1988; Leddy et al., 1994). Also, coping with athletic injuries is a highly involved process that includes, but is not limited to, appraisal of the injury and coping resources, identifying stress sources, and seeking social resources. The type of injury (acute vs. chronic) must also be considered as a factor that may influence an athlete's response to the injury, recovery, and return to sport. However, when examining the cognitive and emotional response of athletes to injury, it is important to utilize research methods that can be generalized to the target population (recreational verses elite athletes), can be generalized to gender differences (utilizing a sample with an equal number of male and female participants), and employ the use of psychometrically sound inventories for assessment.

Self-efficacy Theory

Self-efficacy, as a construct, was developed within the framework of social cognitive theory (Bandura, 1977, 1986, 1997). Social cognitive theory characterizes human functioning within an interdependent causal structure involving triadic reciprocal causation, in which, personal factors, behavior, and environmental events interact to determine one another (Bandura, 1997). Reciprocity does not assume the three interacting factors are of equal strength. Rather, their influence will vary depending on the task and situation. In addition, the theory assumes that each individual has the

cognitive capacity to engage in forethought (self-influence), and self-reflection. Self-efficacy theory focuses on the role of self-referent thought on psycho-social functioning and provides a common mechanism through which individuals demonstrate control over their motivations and behavior (McAuley, 1992).

The terms "self-confidence" and "self-efficacy" have been used interchangeably to describe one's perceived capability to accomplish a certain level of performance (Feltz, 1988). Bandura (1977, 1997) distinguishes between self-confidence and self-efficacy. Self-confidence refers to the strength of the belief or conviction, but does not specify the level of perceived competence. Self-efficacy, on the other hand, is used to specify the level of perceived competence and the strength of that belief (Feltz, 1988).

Self-efficacy theory is based on the principle assumption that psychological procedures serve as means of creating and strengthening expectations of personal efficacy (Bandura, 1977). Within this framework, perceived self-efficacy is distinguished from outcome expectations. Perceived self-efficacy is the conviction that one can successfully execute the behavior required to produce the outcome. Outcome expectancy, however, is a person's estimate that the behavior will lead to certain outcomes. The two terms are differentiated from each other because an individual may believe that a particular course of action will produce certain outcomes, but if she or he harbors doubts about whether she or he can perform the activities or behaviors necessary to produce the outcome, such information does not influence such behaviors (Bandura, 1977, 1986, 1997).

Debate continues over whether self-efficacy expectancy or outcome expectancy is a more salient predictor of behavior. Manning and Wright (1983) found self-efficacy to be a more powerful predictor of behavior than outcome expectancy. Contrary to Manning and Wright, Maddux, Norton, and Stollenberg (1986) found self-efficacy

expectancy and outcome expectancy to be equally good predictors of behavioral intentions. They also reported outcome expectancy added as much predictability to self-efficacy expectations as self-efficacy expectations added to outcome expectancy. These findings support Bandura's (1977, 1986) notion that personal efficacy and outcome expectancy are important cognitive mediators whose strength for prediction of behavior varies according to the task and situation.

Within his social learning theory, Bandura (1997) acknowledges that people's beliefs about their personal efficacy constitute a major aspect of their self-knowledge. Self-efficacy beliefs are constructed from four primary sources of information: performance accomplishments and mastery experiences; vicarious experience; verbal persuasion and allied types of social influence; and physiological and affective states. Any given influence, depending on its form, may operate through one or more of these sources of efficacy information, though some are more influential than others (Bandura, 1977, 1997).

Performance accomplishments are the most influential and dependable source of efficacy information because they provide the most authentic evidence of whether one can gather and utilize whatever it takes to succeed (Bandura, 1977, 1997; Feltz, 1988; Feltz & Doyle, 1981). Success at a task, behavior, or skill builds a robust belief in one's personal efficacy. Repeated failures lower perceived self-efficacy, especially if failures occur before a sense of efficacy is firmly established (Bandura, 1977, 1997; Feltz, 1992; Maddux, 1995). Mastery experience's influence on perceived efficacy is also dependent on the perceived difficulty of the task, the effort expended, and the amount of physical guidance received (Feltz, 1988). For instance, success at tasks deemed difficult, tasks independently attempted, and skill acquisition with occasional failures experienced later in learning provide a more distinguished judgment of efficacy

than easy tasks, tasks acquired with assistance, and learning with numerous failures experienced earlier in learning. Flint (1991) asserts that in the case of the rehabilitating athlete, performance accomplishments are not available as a source of efficacy information unless the athlete has already experienced rehabilitation from a previous serious injury. Therefore, the athlete is required to rely on other sources of efficacy information regarding her or his ability to rehabilitate.

Individuals do not rely on mastery experience as the sole source of information regarding their level of self-efficacy. Through learning mechanisms such as observations, modeling, and imitation, vicarious experiences serve as another effective tool for promoting a sense of efficacy. However, because vicarious experiences involve the comparison of self to other, it may provide efficacy information that is generally weaker than performance accomplishments (Bandura, 1977, 1986, 1997; Feltz, 1988; Feltz & Doyle, 1981; Maddux, 1995). To strengthen the influence of vicarious experiences, a number of factors must be considered. For instance, the model should act as a source that closely resembles the individual attempting to assimilate the behavior or skill demonstrated (Bandura, 1997; Feltz, 1988; Flint, 1991; Maddux, 1995). When the provider of the vicarious experience is more similar in appearance, cognition, and skill ability to the individual, the information provided by the source is more likely to be received and accepted by the recipient than when the source is dissimilar. In the case of the injured athlete, she or he gains knowledge about rehabilitation; strategies for handling setbacks; and the confidence that if others can recover then so can she or he (Flint 1991, 1993).

Verbal persuasion provided by social interactions is another source for strengthening individuals' beliefs that they are capable of achieving whatever it is they seek to accomplish. According to Bandura (1997) verbal persuasion is widely used

because of its ease and ready availability. In comparison to mastery experiences, verbal persuasion is a weaker source influencing efficacy expectations (Bandura, 1977, 1997; Feltz, 1988; Maddux, 1995). Because it is dependent upon the perceived credibility, prestige, trustworthiness, and expertise of the persuader, the persuasive influence of verbal and social persuasion may be less powerful than other sources of efficacy. However, persuasive techniques can be effective if the heightened appraisal is within realistic bounds (Feltz & Doyle, 1981) and the persuader is perceived as a credible source for the individual receiving the information. Injured athletes receive verbal encouragement from coaches, trainers, teammates, and others close to them to reinforce self-efficacy and persistence (Flint, 1991). Depending on these persons' relationship with the athlete, direct assurance may be of benefit to adherence to the rehabilitation program, self-confidence, and sport performance upon return to sport. For instance, if the sportsmedicine physician and/or athletic trainer's word has been accurate in the past, the athlete may feel more confident after the physician or trainer's reassurance that the athlete can and will perform up to expectations. However, providers of persuasive information should be aware that continual deception and relaying of faulty information may undermine the trust an athlete needs to have in his/her coaches, trainers, and physicians regarding concerns such as injury diagnosis, treatment, and recovery progress.

Individuals rely on the somatic information provided by physiological and emotional states when judging their capabilities (Bandura, 1997). Somatic indicators of personal efficacy are relevant in domains that involve health functioning and physical accomplishments. During stressful situations, individuals interpret physiological activation as signs of vulnerability and dysfunction. Because high arousal often debilitates performance, individuals are more likely to expect success when they are not

overwrought with excessive arousal than when they are tense and over aroused (Bandura, 1977, 1997). When individuals become aware of unpleasant physiological arousal, they are more likely to doubt their behavioral competence than if their physiological state were pleasant and neutral. However, if individuals are not sufficiently stimulated to act on their self-percepts of efficacy, performance will not be successful either (Bandura, 1977, 1997; Feltz, 1988). In sport and physical activity, physiological information is an important source of efficacy information (Feltz & Riessinger, 1990). Recovery from physical injury requires toilsome hours at graded activity programs (i.e., progression of rehabilitation exercises, limited practice sessions). Anxiety about the uncertainty of the future may be exacerbated by the severity of the injury and the limitations imposed by the injury (Flint, 1993). Skills can rapidly decline through disuse during recovery. Although the physical injury may mend, nagging self-doubts about existing capabilities may linger to mar performance long after physical function has been fully regained (Bandura, 1997).

Because there is a reciprocal relationship between self-efficacy and physiological arousal (Flint, 1991), perceptions of optimal arousal can be associated with higher self-efficacy levels and vice versa. If controlling physiological arousal results in success, then the negative effect of feelings of fatigue, aches, and pain will diminish (Taylor, Bandura, Ewart, Miller & DeBusk, 1985). Injury rehabilitation is physically taxing and demands an enormous effort on the part of the athlete. "Correct reading of the body's physiological response to exercise can enhance the injured athlete's perceptions of physical capability" (Flint, 1991, pp. 41).

Summary. These four sources of efficacy information are not mutually exclusive in terms of the information they provide (Feltz, 1992, 1994). Bandura (1997) stresses that a strong sense of efficacy does not arise simply from the incantation of capability.

Instead, a sense of efficacy is constructed through a complex process of self-persuasion encouraged by the interaction of the four sources of efficacy information. The effect of information gathered through these sources influence efficacy expectations and how much effort an individual will expend and how long she or he will continue toward a goal despite adverse experiences, set backs, and obstacles (Bandura 1977, 1997; Flint 1991). Flint asserts that athletes with a strong sense of physical efficacy are likely to experience a more rapid and complete recovery from injury and illness. Therefore, a vital component in rehabilitation is the enhancement of physical self-efficacy.

Measurement of Self-Efficacy: Development of Scales

Personal efficacy is a multifaceted phenomenon. A high sense of efficacy in one domain does not imply the existence of a similar sense of efficacy in other realms. Therefore, Bandura (1977, 1997) asserts that personal efficacy cannot be assessed by an omnibus test. Rather, a microanalytic approach where measures of efficacy are tailored to specific domains of functioning and representative of gradations/levels of task demands within those domains should be used to explain and predict strength of personal efficacy.

Analysis of personal efficacy requires a detailed assessment of the level, strength, and generality of perceived self-efficacy (Feltz, 1988). The "level" of efficacy beliefs refers to individuals' expected performance attainment given varying degrees of task difficulty. "Generality" refers to the number of domains individuals may judge themselves to be efficacious (Bandura, 1977, 1997; Feltz, 1988). "Strength" refers to the strength of an individual's belief that s/he can attain different levels of performances. Bandura (1997) iterates that the stronger the sense of personal efficacy, the greater the perseverance and the higher the likelihood the chosen activity will be performed successfully. Flint (1991, 1993) and Feltz (1988) support Bandura's findings and argue

that a strong sense of perceived physical self-efficacy enhances recovery rate and increases athletes' willingness to adhere to rehabilitation protocol.

Methods for measuring efficacy beliefs require presenting individuals with various levels of a task in which they rate the strength of their beliefs in their ability to successfully perform the skill or activity. Self-efficacy scales should also be tailored to measure efficacy beliefs specific to the psychological domain selected for the study (Bandura, 1997). For this, a conceptual analysis of the task's subskills necessary for performance and a contextual analysis of the level of situational demands are required (Feltz, 1988).

Bandura (1997) provides the following guidelines for developing an inventory for measuring efficacy. Standard methodology for measuring self-efficacy beliefs involves presenting individuals with items portraying different levels of task demands where they rate their strength of the belief in their ability to execute the requisite activities (e.g., drills, stretches, warm-up run and activities). The items should be phrased in terms of "can do" (a judgement of capability) rather than "will do" (a statement of intention). Strength of beliefs should be recorded on an 11-point scale ranging from 0 ("cannot do"); through intermediate degrees of assurance, 5 ("moderately certain can do"); to complete assurance, 10 ("certain can do"). The efficacy strength scores are summed and divided by the total number of items to indicate the strength of perceived self-efficacy for the activity domain. A measure of efficacy level can be determined by selecting a cutoff value below which injured athletes would judge themselves incapable of executing the activities in question.

Summary. Personal efficacy is a multifaceted phenomenon which cannot be assessed by an omnibus test. Instead, analysis of personal efficacy requires assessment of the level, strength, and generality of perceived self-efficacy. Self-efficacy

scales should measure athletes' beliefs in their ability to fulfill different levels of task demands within the psychological domain selected for study.

Assisting Recovery: The Role of Social Support

Physical injury has several psychological and emotional effects on athletes. These included the emotional trauma of the onset of injury, psychological factors that influence the recovery process, and the psychological impact injury has on an athlete's future performance. To help an athlete learn to cope with an injury, persons involved with his/her rehabilitation need to be supportive and reassuring, and at the same time, encourage the athlete to view the injury in a rational, self-enhancing way (Feltz, 1982). These persons who help an athlete cope with injury (onset, recovery, and return to sport) are often called social supporters. Social support involves a network of personal ties which serves to meet an athlete's needs for venting feelings, reassurance, and improved communication. Providers of social support, which include family members, friends, coaches, teammates, and healthcare providers (physicians and athletic trainers), also serve to reduce uncertainty during times of stress and aid in the mental and physical recovery of injured athletes (Rosenfeld, Richman, & Hardy, 1989). The following is a review of findings within the sport psychology literature where researchers examined the role of social support and its relationship to athletic injuries.

The role of the sportsmedicine physician and athletic trainers in the physical and psychological recovery of athletes who sustain injuries has begun to enjoy a great deal of attention recently within the sport psychology literature. Guidelines for health practitioners can be found in a number of literature sources (Danish, 1982; Feltz, 1982; Petitpas & Danish, 1995; Rotella, 1985). The consensus is that an athlete's ability to cope with the injury can be dependent upon the rehabilitation personnel's ability to provide honest and accurate information and eliminate uncertainties or misconceptions

(Feltz, 1982). Effective communication that includes using easy-to-understand language, expressing the exact nature of the injury, providing the rationale for rehabilitation procedures, and information regarding the potential obstacles and how to handle them, help to initiate a relationship between the sportsmedicine physician and/or athletic trainer with the athlete that can encourage adherence to rehabilitation and nurture psychological and emotional health (Samples, 1987). However, it is important to realize that these guidelines arose from a great deal of research.

Rosenfeld, Richman, and Hardy (1989) desired to describe the social support networks of athletes and investigate any differences in the social support networks of low- and high-stressed athletes. One hundred and seventy NCAA Division I college athletes (78 males, 92 females) from a variety of sports completed the Support Functions Questionnaire and the Tedium Questionnaire. The Support Functions Questionnaire provided information regarding (1) who provided social support to the student-athlete, (2) what types of social support were provided, and (3) what perceived amount of support was provided. The Tedium Questionnaire was a measurement of stress that presents respondents with 21 phrases relating to personal experiences. The researchers found providers of support differed in the type of support information they delivered to the athlete. Coaches and teammates provided the kinds of support for which their expertise was prerequisite such as technical challenge support and technical appreciation support. Friends provided the widest range of support which included shared social reality support, listening support, and emotional support. Parents were second to coaches in providing technical appreciation support, and second to friends in providing listening support, emotional support, and emotional challenge. The authors noted that teammates did not provide either emotional support or emotional challenge which may reflect the competition between athletes for the limited number of places and

positions on the team. Two significant findings regarding gender and coping were found by Rosenfeld et al. (1989). First, high-stressed male and low-stressed female athletes reported receiving higher amounts of technical appreciation support from their coaches than did other athletes. Second, low-stressed female athletes reported receiving more listening support from their friends than other athletes reported. Although the researchers provided information for understanding athletes and their social support networks in general, investigations such as this but specific to athletic injury are warranted.

Udry, Gould, Bridges, and Tuffey (1997) examined the social ties of athletes coping with burnout and injury stress. Specifically, they explored the relative prevalence of positive, negative, and neutral interactions reported by athletes experiencing burnout and injury stress. They found that interactions with important others under stressful conditions may consist of a significant number of negative interactions. These findings were consistent with those found in Dakof and Taylor's (1990) study of bereaved and patient populations. Udry and her colleagues attributed findings that athletes tended to view the influence of important others as more negative than positive for several reasons. First, members of athletes' social networks become overwhelmed by the interpersonal demands associated with interacting with athletes who are coping with stress. Coaches, in particular, may be found guilty of this *resources bankruptcy* because they face multiple stressors (e.g., dealing with administrative duties, traveling for competitions, dealing with the media and public). Coaches who are emotionally depleted may be limited in their ability to meet the social needs of athletes dealing with stress from injury and burnout.

Second, those important to athletes coping with injury and burnout may have misconceptions about what behaviors would be considered helpful to the athlete.

Lehman, Ellard, and Wortman (1986) reported that perceived pressure (e.g., parents watching matches, social comparison by coaches) was a commonly mentioned source of social dissatisfaction among athletes experiencing burnout. Perhaps clearer communication between athletes and those who provide social support is necessary (Udry et al., 1997). Another possible reason for Udry and her colleagues' findings was that knowing what behaviors would be helpful, but when encountering face-to-face situations, social interactions with athletes may deteriorate.

Lazarus and Folkman (1984) stated that social support may function by way of reducing the likelihood of events being perceived as stressful. Udry et al. (1997) did not find support for the assumption that social ties help athletes deal with burnout and injury stress. So the next logical question would be then what types of coping strategies and social support interactions are beneficial to athletes coping with injury? Udry's (1997) examination of twenty-five athletes who underwent anterior cruciate ligament (ACL) surgery after sustaining injury through athletic participation and were undergoing surgery primarily so they could return to participation in sport revealed (1) athletes' coping strategies, (2) information regarding their coping strategies and social support, and (3) the relationship between coping, social support, and adherence. Instrumental coping was found to be the most used coping strategy during rehabilitation. That is, athletes attempted to alleviate stress and discomfort through activities such as finding out more about their physical condition and listening to the advice of healthcare providers. Instrumental coping was also found to be the most salient, and positive, predictor of adherence. Examination of potential changes in social support resulted in non-significant time effects which suggests that injured athletes' perceived satisfaction with their social resources remained relatively constant throughout their recovery.

As our understanding of athletes' psychological and emotional responses to injury increases, the need for intervention and the role of sport psychologists as a part of the sportsmedicine team becomes overwhelmingly apparent (Lynch, 1988). A survey of athletic trainers on the use of psychological strategies with injured athletes conducted by Wiese, Weiss, and Yukelson (1991) revealed that athletic trainers believed many psychological skills and strategies are important to the injury rehabilitation program. Athletic trainers considered athletes' willingness to listen to and learn from those perceived as being more experienced or with professional expertise in a specific area to be the most important characteristic of successful coping. Trainers ranked strategies related to good interpersonal communication skills, positive reinforcement, understanding of individual motivation and self-thoughts, and the use of goal setting as important techniques. However, psychological skills and strategies such as relaxation, imagery, and concentration development were not ranked as important techniques. Larson, Starkey, and Zaichkowsky (1996) found support for Wiese et al.'s (1991) findings. However, the athletic trainers in Larson et al.'s (1996) study rated listening skills of athletic trainers higher in importance than did those in the study by Wiese et al. (1991).

Ross and Berger (1996) investigated the effects of stress inoculation training on subjective pain, anxiety, and physical functioning among athletes after knee surgery. Sixty athletes who obtained a meniscus injury in one knee during participation in an athletic activity, received arthroscopic surgery, rehabilitated from surgery for at least three weeks, and had no previous history of either surgical treatment or physical therapy for an athletic injury were included in the study. Athletes completed the State-Trait Anxiety Inventory (STAI) and a visual analogue scale (VAS). Measurement of knee strength for determining return to physical functioning was determined by the widely-

used Cybex II isokinetic dynamometer. Stress inoculation procedures for the athletes involved the following: (1) a rationale for understanding their cognitive and emotional responses to surgery and information that they would likely experience anxiety and pain during rehabilitation (conceptualization); (2) training in self-monitoring cognitive and emotional indicators of stress and pain, physical-based relaxation strategies, cognitive-based relaxation strategies, positive coping statements, and self-reinforcement statements (skill acquisition), and (3) instructions to rehearse these strategies several times a day and to use them in response to discomfort or pain cues (application). Ross and Berger found that psychological intervention significantly reduced self-reports of anxiety and pain in athletes during post-surgery rehabilitation of knee injury. Their findings also indicated that psychological treatment methods significantly reduced the amount of time to return athletes to an adequate level of physical functioning.

Summary. Research examining the role of social support, coping, and athletic injury has revealed effective types of coping used by injured athletes (Udry, 1997, Udry et al., 1997), athletic trainers' perceptions of the psychological aspects of athletic injury (Larson et al., 1996; Wiese, et al., 1991), and the effects of stress inoculation on rehabilitation after orthopedic surgery (Ross & Berger, 1996). It is clear that the role of individuals such as the sport psychologist, athletic trainer, coach, family members, friends, and teammates play an important part in athletes' recovery from injury. Perhaps how those roles should be delivered was made clearer with the information provided in this review, however, many researchers would state that this is just the tip of the iceberg in understanding our roles in injury rehabilitation and psychological welfare.

CHAPTER 3

METHODS

Research Design

This study employed a within subjects research design with six repeated measures. The within subjects design is one in which each participant serves in all the treatment conditions and treatment effects are represented by differences within the single group of participants serving in the study (Keppel, 1991). In addition, the within subjects research design requires fewer participants and is more sensitive than the completely random or between subjects design (Keppel, 1991).

Fluctuations in affect and mood states were assessed by scores obtained from repeated administration of The Profile of Mood States Short Form (POMS). Quantitative measurements of each injured athlete's level of self-confidence and treatment confidence were obtained from repeated administration of a self-report questionnaire. Qualitative information was obtained through short interviews with participants.

Participants

Five student-athletes (2 male, 3 female) participated in the study. A sixth participant completed the first set of questionnaires at injury onset and the initial interview, but was later dropped from the study when a later diagnosis of the injury revealed that it no longer fit the criteria of the study. Participants' ages ranged from 18 to 21 years of age. They were assembled from a variety of sports including basketball (N=2), gymnastics (N=2), and track and field (N=1). Participants met the following criteria for inclusion in the study: (a) was a student-athlete participating in a varsity sport

at a NCAA Division I university; (b) was diagnosed by the team physician or athletic trainer with a severe injury; (c) rehabilitation of the severe injury required no less than 7 days away from practice, (d) the student-athlete's sport had at least 2 weeks remaining in its season, and (e) the injury sustained was not season-ending. (See Table 1 for a description of participants' injuries.) The athletic training staff informed the principal investigator of possible participants for the study. To protect the rights of participants, University guidelines for the use of human subjects was adhered to throughout the study. See Appendix A for notice of the University Committee on Research Involving Human Subjects (UCRIHS) approval.

Table 1

Description of Participants' Injuries, Time Away from Sport Practice, and Total Number of Days in Study

Participant	Injury Area & Description*	No. of Days Away from Practice** (injury onset to med. clearance)	Total No. of Days in Study** (injury onset to 7th practice)
P ₁	foot, sesamoiditis	32	44
P ₂	knee; sprain	28	37
P ₃	knee; tendonitis	18	25
P ₄ [‡]	knee; ACL tear	85	96
P ₅	ankle; sprain	8	19

* Described by the participant

** Number of days include weekend dates

[‡] Participant underwent surgery to repair injury

Instrumentation

Three survey instruments and an open-ended interview were used in the study. First, the demographic survey (see Appendix B) provided general descriptive data and injury information about the study's participants. Student-athletes provided general descriptive information such as ethnicity, year in school, and the varsity sport in which

they currently participate. Participants were asked to provide non-intrusive information describing their injury history, their current injury, and how the current injury occurred.

Designed to meet the need for a rapid and economical method of identifying and assessing transient, fluctuating affective (mood) states (Buros, 1978), the POMS Short Form (see Appendix C), consisting of 30 items as opposed to the 65 items of the long form, was used in this study. The instrument used a 5-point Likert-type scale ranging from 0 (not at all) to 4 (extremely) to measure six identifiable mood or affective states: tension-anxiety, depression-dejection, anger-hostility, vigor-activity, fatigue-inertia, and confusion-bewilderment. Various studies have been conducted to express the validity and reliability of the POMS Short Form. For a college sample of males and females, McNair, Lorr, and Droppleman (1992) reported the following data supporting the reliability of the instrument. Internal consistency for the items within the six mood scales for college females were as follows: tension-anxiety, .82; depression-dejection, .86; anger-hostility, .84; vigor, .93; fatigue, .93; and confusion-bewilderment, .67. For the same items, internal consistency for the college male sample were: tension-anxiety, .73; depression-dejection, .82; anger-hostility, .88; vigor, .87; fatigue, .86; and confusion-bewilderment, .67.

For the 30 items on the POMS Short Form, alternative definitions obtained from The POMS Alternative Words List (Albrecht & Ewing, 1989) was provided on the backside of each questionnaire to assist participants with a word or phrase that was synonymous with the original item, was located nowhere else on the instrument, and was more meaningful to the participant than the original item (see Appendix D). The directions for completing the questionnaire referred participants to the backside of the questionnaire for this resource.

The injury confidence questionnaire (see Appendix E) was used to assess: (a) athletes' confidence that the injury diagnosis and rehabilitation program was sufficient enough to heal the injury and prevent reinjury (treatment confidence), and (b) athletes' self-confidence in their ability to execute the sport skills required to produce an equal quality of performance acquired prior to the injury. The treatment confidence inventory consisted of nine items (items 1-9 of the injury confidence questionnaire). Items 1-8 asked injured student-athletes to rate their confidence in injury diagnosis, the providers of treatment and care, and the rehabilitation facility on an 11-point scale ranging from 0 (not at all confident) to 10 (highly confident). Item 9 of the inventory asked participants to self-report their perceived percent healed (on a scale of 0-100%) at each assessment period. Item 9 was scored as an independent variable from items 1-8. Interpretation of group mean scores coincided with that of the inventory's 11-point scale.

The self-confidence inventory consisted of eight items (items 10-17 of the injury confidence questionnaire). Injured student-athletes rated their current ability to perform specific sport skills in comparison to their ability prior to injury on an 11-point scale ranging from 0 (not at all confident) to 10 (highly confident). Interpretation of group mean scores coincided with that of the inventory's 11-point scale.

The third instrument, the in-depth interview questions (see Appendix F), allowed participants to give open-ended responses about their perceived confidence. The interview consisted of questions leading to the disclosure of factors injured athletes believe contributed to shifts, maintenance, and enhancement of self-confidence and treatment confidence during rehabilitation. A major strength of the interviews was that they identified common factors athletes associated with changes in levels of confidence. Interviews were conducted by the principal investigator in a private area throughout the assessment period.

Data Collection Procedures

Data collection began in December, 1997 and continued through March, 1998. The athletic training staff informed the principal investigator as soon as possible after an athlete sustained a severe injury. The researcher also remained in close contact with the athletic training staff to assure notification of potential participants.

Participants were asked to sign a consent form (see Appendix G) which provided the following: (a) a summary explanation of the study, (b) an estimate of the participant's time, (c) an explanation of the participant's rights as a volunteer in the study, (d) a statement of protection of confidentiality and anonymity, and (e) instructions on whom to contact regarding questions or concerns that may be raised by participating in the study. To maintain anonymity, athletes were instructed to place the initial of their first and middle names along with the last 4 digits of their social security number at the top of the survey instruments. Participants were known by these codes for the remainder of the study. After informed consent was obtained, athletes were reassured that participation in the study was voluntary and their responses would be held confidential. The survey instruments were then administered.

Each participant was administered the POMS and the confidence questionnaire six times during the data collection period: (a) immediately following the onset of injury, (b) midway through recovery (determined by athletic trainers), (c) when medically cleared by either the sportsmedicine physician or athletic trainer to return to full or partial practice, (d) immediately before the first practice session, (e) immediately before the third practice session, and (f) immediately before the seventh practice session. All participants were interviewed. Although it was intended that each athlete would be interviewed three times during the assessment period (at injury onset, once during

recovery, and once after returning to practice), one athlete declined participation in the later two interviews.

Questionnaires were administered in the training room in which the athlete received treatment. Student-athletes who met the participation criteria were asked individually to participate in the study. Staff trainers dispensed the surveys at the appropriate 6 times to each athlete (see Appendix H for data collection instructions for athletic trainers). Once athletes returned to practice, measurements and interviews were conducted 1 to 3 hours prior to the practice session and administered in a private area.

The administrator of the questionnaires allowed time for questions. Envelopes addressed to the principal investigator were provided so athletes could secure their questionnaires and maintain confidentiality. Participants were instructed to sign and date the flap of sealed envelopes and place them in a bin marked for pick up by the principal investigator. Interviews were audio taped and conducted by the principal investigator. Questionnaires and interviews took approximately 10 to 15 minutes per session to complete.

Data Analysis

Descriptive statistics (means, standard deviations, and frequency) were used to summarize demographic information and the level of confidence during rehabilitation of severe injuries sustained by student-athletes. Paired sample *t* tests were used to compare the confidence of injured athletes at the six different times of testing to identify when confidence was reported at its lowest during rehabilitation (at onset, midway through, etc.). Because a small sample size ($N=5$) was achieved for this study, effect sizes for *t* test comparisons were also calculated. A number of tables and graphs describing individuals' responses to the study's content were also generated.

To assess fluctuating affective (mood) states, POMS scores (McNair et al., 1992) for each mood factor were calculated by summing the responses obtained for the adjectives defining the factor. Items of the survey were scored in the same direction with the exception of one item: "efficient." This item received negative weight in calculating the subscale score. To satisfy one of this study's research questions, the POMS score means acquired from this study were compared to the Iceberg profile (Morgan & Pollock, 1977) to find if the psychological characteristics associated with elite and college level athletes were applicable to athletes while they recover from severe athletic injuries.

Data obtained from interviews were transcribed and compared to find similarities in athletes' responses. Focus was placed on factors identified by injured athletes that influenced fluctuations, maintenance, and enhancement of self-confidence and treatment confidence during rehabilitation. Issues of concern (social support, physician's care) for injured athletes were also identified.

CHAPTER 4

RESULTS

Part I: Results of Questionnaire Data

This study was designed to assess the relationship between confidence and injury recovery. More specifically, the study was designed to assess fluctuations in treatment confidence relative to injury treatment and care, self-confidence in performance ability, and mood state over the time of injury onset to the seventh practice session after full medical clearance. Incremental comparisons of scale means of treatment confidence, self-confidence, total mood disturbance scores (POMS scores), and POMS subscales (anger, confusion, depression, frustration, tension, and vigor) were conducted in paired-sample t tests. Because it was hypothesized that athletes' lowest level of self-confidence in performance ability would be reported nearest the third practice session after full medical clearance, paired comparisons of scale means and POMS scores at key assessment points (injury onset to third practice, third practice to seventh practice, injury onset to seventh practice) were also analyzed.

Because a small sample size ($N=5$) was achieved for the study, adjustments to statistical analysis and report of research findings were made. First, the rejection region for finding significance was increased from $p<.05$ to $p<.10$. Raising the rejection region to $p<.10$ increases the probability of accepting the research hypothesis when it may be false (type I error). However, because of the exploratory nature of the study, leniency toward type I errors may be warranted (Keppel, 1991).

Secondly, the effect size (estimated omega squared, $\hat{\omega}^2$) of statistical tests were calculated (see Figure 3). Estimated omega squared "is based on two variances derived from the treatment populations, one based on the differences among the population treatment means and the other based on the variability within the treatment population" (Keppel, 1991, p. 64). Estimated omega squared reveals if a potentially important effect was reflected in the data. Because this statistic accounts for sample size, it allowed the researcher to reason that acceptance of the null hypothesis was probably due to the low power afforded by the sample size (large or small) (Keppel, 1991). The strength of the statistic reflects the proportion of variation "explained" or "accounted for" by the treatment manipulation. Using Cohen's description of effect size in the behavioral and social sciences (cited from Keppel, 1991, p. 66), interpretation of estimated omega squared was as follows: "small" effect when $\hat{\omega}^2 < .06$ and $\geq .01$; "medium" effect when $\hat{\omega}^2 < .15$ and $\geq .06$; and "large" effect when $\hat{\omega}^2 \geq .15$.

Figure 3. Formula for calculating estimated omega squared ($\hat{\omega}^2$).

$$\hat{\omega}^2 = \frac{(a-1)(F-1)}{(a-1)(F-1) + (a)(n)}$$

Where:

a = number of independent observations

n = sample size

F = observed F ratio

Treatment Confidence

Mean scores of treatment confidence at the six different assessment points (see Table 2) showed athletes' confidence in the treatment they received for their injuries was moderately high and increased during the assessment period, with one exception. Athletes' confidence in treatment decreased when they received medical clearance to return to full practice, however, this change was not found to be significant, $t(4) = .47$, $p = .67$, $\hat{\omega}^2 = .08$. A series of t tests were performed to determine changes in treatment confidence (see Table 3). Analysis of treatment confidence revealed injured athletes'

confidence increased from the onset of injury to midway through recovery, $t(4)=-2.46$, $p=.07$, $\hat{\omega}^2=.34$. Overall, comparison of treatment confidence at injury onset to the seventh practice session showed athletes' confidence in injury diagnosis, care, and treatment increased over time, $t(4)=-2.26$, $p=.09$, $\hat{\omega}^2=.29$.

Table 2

Means and Standard Deviations of Treatment Confidence at Six Different Assessment Points

Assessment Point	Mean (N=5)	Std. Deviation
Onset	8.18	1.28
Recovery Midpoint	8.95	1.01
Med. Clearance	8.80	1.58
1st Practice	9.20	1.15
3rd Practice	9.55	.71
7th Practice	9.60	.65

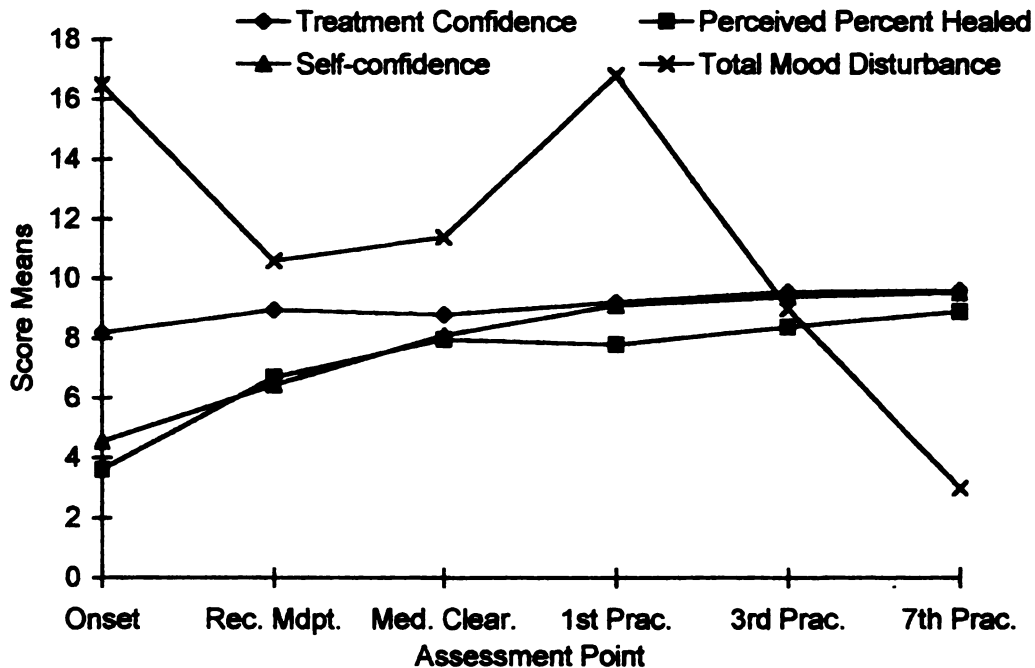
Table 3

Summary of Paired-Sample T Tests of Means of Treatment Confidence

Assessment Points Compared	t	df	Sig. (2-tailed)	Effect Size ($\hat{\omega}^2$)
Onset to Recovery Midpoint	-2.46*	4	.07	.34
Recovery Midpoint to Med. Clearance	.47	4	.67	.08
Med. Clearance to 1st Practice	-.89	4	.42	.02
1st Practice to 3rd Practice	-1.63	4	.18	.14
3rd Practice to 7th Practice	-1.63	4	.18	.14
Onset to 7th Practice	-2.26*	4	.09	.29

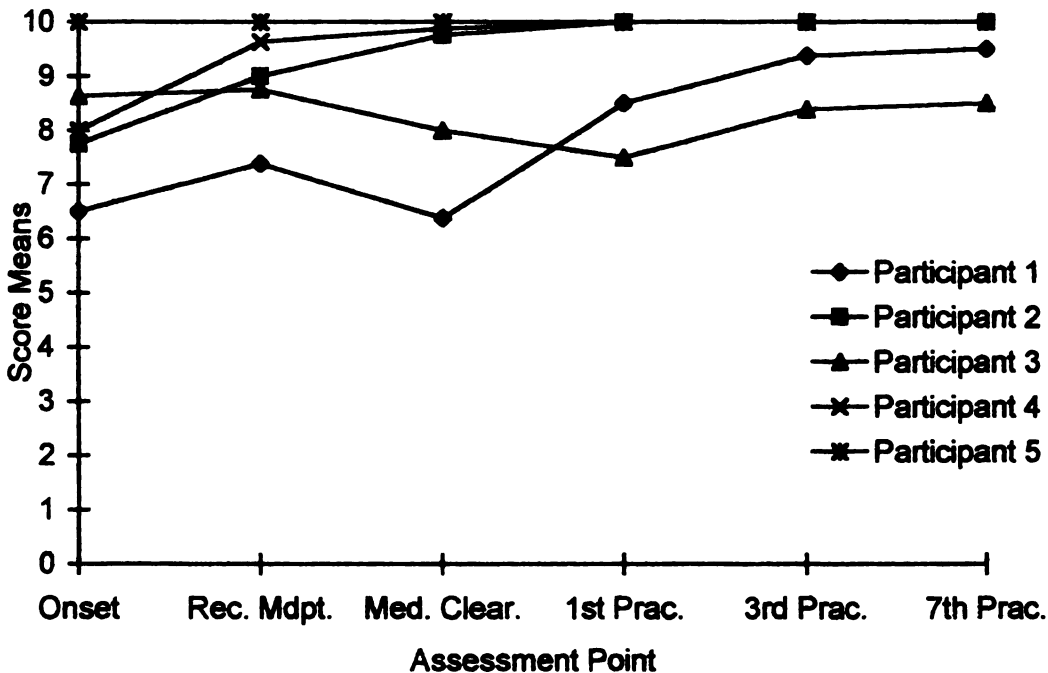
*Significant at $p<.10$

Figure 4. Injured athletes' (group means) treatment confidence, self-confidence, perceived percent healed, and total mood disturbance score means at each assessment point.



A graphed comparison of individual injured athlete's change in treatment confidence over time provided additional support for statistical findings (see Figure 5; and Appendix I, Table I1). Each athlete's treatment confidence increased as s/he recovered from injury. However, two athletes experienced decrements in treatment confidence when they received clearance to return to practice. Their drop in confidence was reflected in the group data (see Table 2 & Figure 4). While one athlete was able to rebound by the next assessment period, the second athlete required more time before regaining confidence in the treatment. Although analysis of group data provided a necessary yet general overview of injured athletes' confidence during recovery and analysis of individual responses provided support for group findings, differences in individual responses should not be ignored or dismissed as outliers in the data.

Figure 5. Individual injured athletes' treatment confidence score means at each assessment point.



Summary. The data provided important information regarding fluctuations in athletes' treatment confidence. First, at the onset of injury, injured athletes' confidence in the treatment they received for their injuries was moderately high. As rehabilitation continued, athletes' confidence in the sportsmedicine team's ability to return them to an equal quality of performance acquired prior to injury increased (see Figure 4). Second, although there was an overall increase in treatment confidence during recovery, athletes expressed a decrease in treatment confidence when cleared to return to practice. Finally, athletes reported their greatest confidence in the treatment at the seventh practice session.

Self-confidence

It was hypothesized that athletes would report their lowest level of self-confidence in their ability to perform as well as prior to injury nearest the third practice

session after medical clearance in comparison to all other points during assessment. Paired t tests of means revealed several significant changes in athletes' self-confidence (see Table 5). First, injured athletes were significantly more confident in their ability to perform sport-specific skills when medically cleared to return to full practice in comparison to midway through recovery, $t(4)=-2.61$, $p=.06$, $\hat{\omega}^2=.37$. Second, self-confidence was greater before the first practice session than when medically cleared to return to full practice, $t(4)=-2.14$, $p=.10$, $\hat{\omega}^2=.26$. Third, athletes were more confident in their performance ability at the third practice in comparison to the first practice after full medical clearance, $t(4)=-2.27$, $p=.09$, $\hat{\omega}^2=.29$. Analysis of means at key points in time relevant to the research hypothesis revealed a significant increase in participants' self-confidence between the onset of injury and just prior to the third practice session, $t(4)=-4.10$, $p=.02$, $\hat{\omega}^2=.61$. Overall, student-athletes' confidence in their ability to perform specific sport skills increased as they recovered from injury, $t(4)=-4.4510$, $p=.01$, $\hat{\omega}^2=.65$. However, the data analysis did not support the research hypothesis. Injured athletes reported their lowest level of self-confidence at injury onset rather than at the third practice session as predicted (see Table 4).

Table 4

Means and Standard Deviations of Self-confidence at Each Assessment Point

Assessment Points	Mean (N=5)	Std. Deviation
Onset	4.55	2.58
Recovery Midpoint	6.43	.76
Med. Clearance	8.10	1.29
1st Practice	9.10	.76
3rd Practice	9.38	.62
7th Practice	9.53	.45

A graphed comparison of individual injured athlete's change in self-confidence over time further supports statistical findings (see Figure 6; Appendix I, Table I2). Similar to treatment confidence (see Figure 4), athletes' self-confidence in their performance ability increased as they progressed through recovery. However, at injury onset, athletes' confidence in their ability to perform activities specific to the practice session was low to moderate. Midway through recovery, they held moderate confidence in their ability to perform practice activities. Not until reception of medical clearance did athletes obtain a moderately high to high degree of confidence in performance ability. Apparently, individuals varied greatly in degree of self-confidence at injury onset. However, athletes reported similar beliefs in degree of self-confidence in their ability to perform specific practice activities as well as prior to injury throughout the remainder of the study.

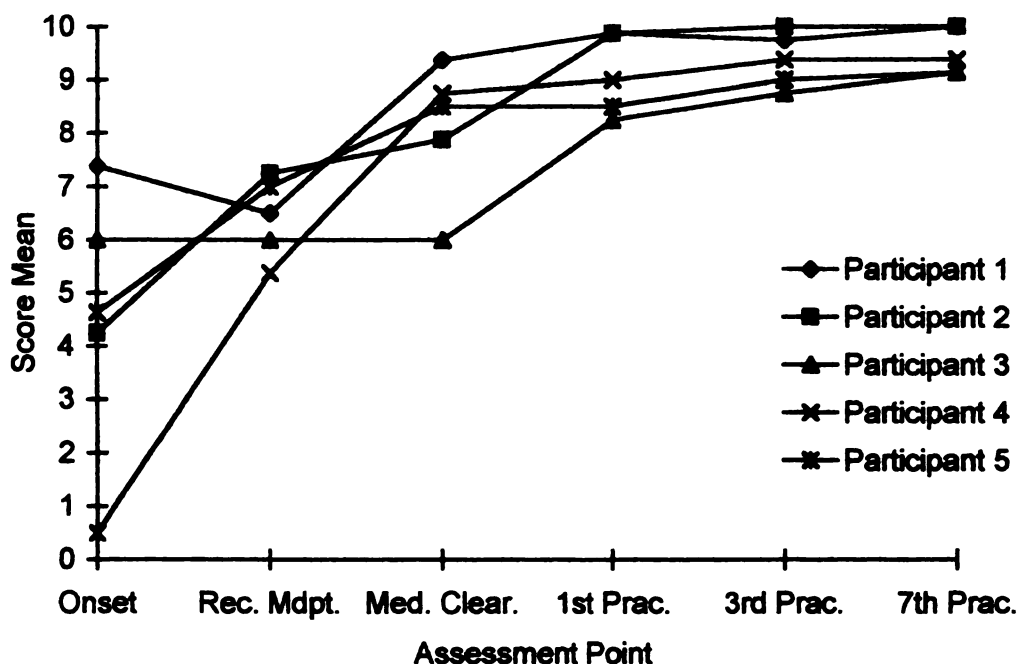
Table 5

Summary of Paired-Sample T Tests of Means of Self-confidence

Assessment Points Compared	t	df	Sig. (2-tailed)	Effect Size ($\hat{\omega}^2$)
Onset to Recovery Midpoint	-1.80	4	.15	.18
Recovery Midpoint to Med. Clearance	-2.61*	4	.06	.37
Med. Clearance to 1st Practice	-2.14	4	.10	.26
1st Practice to 3rd Practice	-2.27*	4	.09	.29
Onset to 3rd Practice	-4.10 [‡]	4	.02	.61
3rd Practice to 7th Practice	-2.06	4	.11	.24
Onset to 7th Practice	-4.45 [‡]	4	.01	.65

*Significant at $p < .10$; [‡] Significant at $p < .05$

Figure 6. Individual injured athletes' self-confidence score means at each assessment point.



Item 9 of the confidence scale asked student-athletes to report their perceived percent healed (on a scale of 0 to 100 percent) at the time of each assessment. Comparison of mean scores (see Tables 6 and 7) of injury onset to the seventh practice session showed injured student-athletes reported a steady incline in perception of percent healed as they continued rehabilitation and recovery, $t(4)=-3.09$, $p=.04$, $\hat{\omega}^2=.46$. Incremental increases in perceived percent healed at two assessment points were found to be significant. Participants' perception of percent healed midway through recovery was significantly greater than their beliefs at the onset of injury, $t(4)=-2.52$, $p=.07$, $\hat{\omega}^2=.35$. Their perceptions of percent healed also increased from the third practice session to the seventh practice session, $t(4)=-2.44$, $p=.07$, $\hat{\omega}^2=.33$.

Table 6

Means and Standard Deviations of Perceived Percent Healed at Each Assessment Point

Assessment Point	Mean (N=5)	Std. Deviation
Onset	36.00	30.50
Recovery Midpoint	67.00	15.65
Med. Clearance	79.60	11.44
1st Practice	77.80	18.95
3rd Practice	83.80	11.05
7th Practice	89.00	8.94

Table 7

Summary of Paired-Sample T Tests of Means of Perceived Percent Healed

Assessment Points Compared	t	df	Sig. (2-tailed)	Effect Size ($\hat{\omega}^2$)
Onset to Recovery Midpoint	-2.52*	4	.07	.35
Recovery Midpoint to Med Clearance	-2.08	4	.11	.25
Med. Clearance to 1st Practice	.37	4	.73	.08
1st Practice to 3rd Practice	-1.50	4	.21	.11
3rd Practice to 7th Practice	-2.44*	4	.07	.33
Onset to 7th Practice	-3.09 [‡]	4	.04	.46

*Significant at $p < .10$; [‡] Significant at $p < .05$

Bandura (1977, 1997) stated that one of the major ways to alter confidence was to enhance physical status. Therefore, barring recovery setbacks, the relationship between confidence (in self and treatment) and perceptions of percent healed was expected to be positively correlated. That is, as athletes continued to progress in their injury recoveries, their confidence in their ability to perform skills as well as prior to injury and in the treatment they received would increase. Pearson correlations for treatment

confidence and perceived percent healed, and self-confidence and perceived percent healed were conducted (see Table 8). Perceptions of percent healed was correlated with treatment confidence at one assessment point of the study, onset of injury. That is, athletes' confidence in the treatment they received ($M=8.18$, $SD=1.28$) was related to their low perception of percent healed ($M=36.00$, $SD=30.50$) at injury onset, $r=.78$, $p=.07$. A relationship between injured athletes' self-confidence in their performance ability and perceptions of percent healed was not found while they were away from team practice (during recovery). Once athletes received medical clearance to return to practice, a relationship between their self-confidence and perceived percent healed was apparent.

Table 8

Pearson Correlations of Treatment Confidence with Perceived Percent Healed and Self-confidence with Perceived Percent Healed

Assessment Point	Correlated Variables			
	Treatment Confidence with Perceived Percent Healed		Self-confidence with Perceived Percent Healed	
	r	p	r	p
Onset	.78*	.07	.19	.71
Recovery Midpoint	-.28	.65	.79	.11
Medical Clearance	-.64	.24	.63	.25
1st Practice	.43	.47	.85*	.07
3rd Practice	.41	.49	.81*	.06
7th Practice	.34	.57	.95 [‡]	.01

*Significant at $p<.10$; [‡] Significant at $p<.05$

Summary. Injured athletes' confidence in their ability to perform specific sport skills related to a typical practice session increased throughout the assessment period of the study. A decrement in self-confidence near the third practice session, as

hypothesized, was not found. Perceptions of percent healed were not found to be significantly correlated to treatment confidence, nor were they correlated with self-confidence during recovery (time spent away from team practice). However, self-confidence was correlated with perceived percent healed at assessments taken after athletes received medical clearance and returned to practice.

Mood States

Total mood disturbance and mood factor (subscale) raw scores of the Profile of Mood States short form were obtained using overlay stencils for hand-scoring provided by the Educational and Industrial Testing Service (EdITS). Total mood disturbance raw scores were obtained by summing the scores (with Vigor weighted negatively) on the six primary mood factors. To obtain a score for each mood factor, the sum of the responses was obtained for the adjectives defining the subscale. All items defined in each factor were keyed in the same direction except for "efficient" in the confusion scale. This item received negative weight in calculating the subscale. Tables of means and *t* test results of mood factors that did not undergo significant change are reported in Appendix J. A graph of participants' POMS subscale raw score means at each assessment point of the study can also be found in Appendix J (see Figure J1).

Over the course of recovery, athletes underwent significant changes in their total mood disturbance (see Tables 9 and 10, and Figure 7). That is, in comparison to the onset of injury, athletes' total mood disturbance was significantly less at the seventh practice session after receiving medical clearance, $t=6.72$, $p=.003$, $\hat{\omega}^2=.87$.

Incremental comparison of total mood disturbance score means showed that injured athletes' changes in total mood state from one assessment period to the next period were not significant. However, it is important to note the strong similarity in participants' total mood disturbance means at the onset of injury and the first practice session.

Similar to the comparison of injury onset to the seventh practice, athletes' total mood disturbance was significantly less at the seventh practice than at the first practice session, $t=3.70$, $p=.02$, $\hat{\omega}^2=.67$.

Table 9

Total Mood Disturbance: Means and Standard Deviations

Assessment Point	Mean (N=5)	Std. Deviation
Onset	16.50	23.73
Recovery Midpoint	10.60	25.07
Med. Clearance	11.40	26.35
1st Practice	16.80	26.24
3rd Practice	9.60	26.36
7th Practice	3.00	22.16

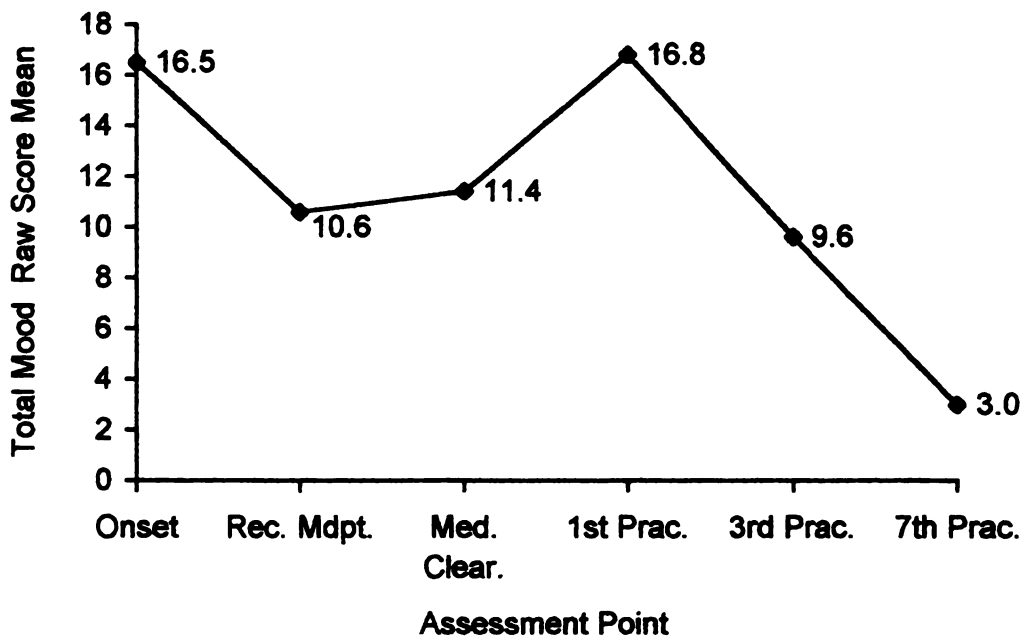
Table 10

Total Mood Disturbance: Summary of Paired-Sample T Tests of Means

Assessment Points Compared	t	df	Sig. (2-tailed)	Effect Size ($\hat{\omega}^2$)
Onset to Recovery Midpoint	1.57	4	.19	.27
Recovery Midpoint to Med. Clearance	-0.21	4	.85	.01
Med. Clearance to 1st Practice	-1.22	4	.29	.18
1st Practice to 3rd Practice	1.76	4	.15	.32
3rd Practice to 7th Practice	2.06	4	.11	.39
1st Practice to 7th practice	3.70 [‡]	4	.02	.67
Onset to 7th Practice	6.71 [‡]	4	.00	.87

[‡]Significant at $p<.05$

Figure 7. Injured athletes' total mood disturbance score group means at each assessment point.



Incremental comparison of means of the confusion subscale showed participants' scores did not significantly change over time (see Appendix J, Table J2). Item means for each assessment period on the confusion subscale (see Appendix J, Table J1) indicated a prevalence of mild confusion throughout the process of recovery and rehabilitation. The large standard deviation scores for this subscale suggested group means may not have provided an accurate representation of participants' mood state during the assessment period. However, given the small to medium effect sizes found for this variable (see Appendix J, Table J2), it is unlikely that levels of confusion during recovery and upon return to sport found in this study will be different with a larger participant sample.

Injured student-athletes reported mild fatigue throughout the study's assessment period with fatigue lowest just prior to the first practice session after medical clearance (see Tables 11 and 12). This "lack" of fatigue prior to the first practice was significantly

lower than that reported when participants were medically cleared to return to full practice, $t(4)=2.30$, $p=.08$, $\hat{\omega}^2=.30$. However, given Cohen's interpretation of effect size (cited in Keppel, 1991, p. 66), it is probable that with a larger sample size group changes in fatigue over time may be found.

Table 11

Fatigue Subscale of the POMS: Means and Standard Deviations

Assessment Point	Mean (N=5)	Std. Deviation
Onset	4.00	4.18
Recovery Midpoint	5.20	5.45
Med. Clearance	6.20	6.18
1st Practice	3.20	6.61
3rd Practice	4.60	7.06
7th Practice	4.40	6.19

Table 12

Fatigue Subscale of the POMS: Summary of Paired-Sample T Tests of Means

Assessment Points Compared	t	df	Sig. (2-tailed)	Effect Size ($\hat{\omega}^2$)
Onset to Recovery Midpoint	-.53	4	.63	.07
Recovery Midpoint to Med Clearance	-.49	4	.65	.07
Med. Clearance to 1st Practice	2.30*	4	.08	.30
1st Practice to 3rd Practice	-.98	4	.39	.00
Onset to 3rd Practice	-.35	4	.76	.08
3rd Practice to 7th Practice	.25	4	.82	.09
Onset to 7th Practice	-.23	4	.83	.09

*Significant at $p<.10$

Although the standard deviation of scores for the vigor subscale (see Appendix J, Table J3) were variant, incremental comparison of overall means did not show

fluctuations in participants' vigor over the course of the study (see Appendix J, Table J4). In fact, injured athletes maintained a somewhat high level of vigor despite their physical state. Given the small to medium effect sizes found for this variable (see Appendix J, Table J3), it is unlikely that injured athletes' levels of vigor during recovery and upon return to sport will be different with a larger participant sample.

Participants' anger did not change significantly from one assessment period to the next with two exceptions (see Tables 13 and 14). After medical clearance, injured student-athletes exhibited less anger just prior to the third practice session in comparison to prior to the first practice session after medical clearance, $t(4)=2.56$, $p=.06$, $\hat{\omega}^2=.36$. Overall, injured student-athletes' anger significantly decreased with time while they recovered and returned to practice, $t(4)=2.36$, $p=.08$, $\hat{\omega}^2=.31$. The large effect size found for these statistics suggests that given a larger sample size, group changes in anger over time may be found. However, attention should be drawn to the group's fluctuation in anger during the assessment period (see Figure 8). It is important to note that injured athletes' anger was similar and highest at both the onset of injury and just prior to the first practice session after medical clearance.

Table 13

Anger Subscale of the POMS: Means and Standard Deviations

Assessment Point	Mean (N=5)	Std. Deviation
Onset	7.60	4.98
Recovery Midpoint	4.40	4.72
Med. Clearance	5.00	5.15
1st Practice	7.80	5.26
3rd Practice	4.40	6.19
7th Practice	4.40	4.56

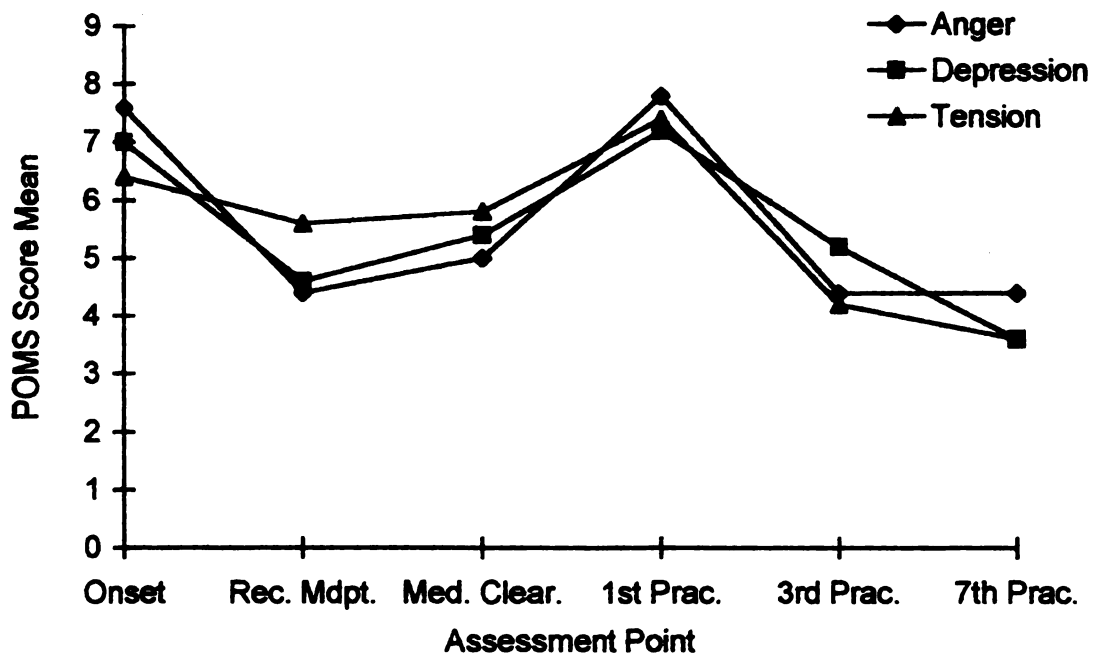
Table 14

Anger Subscale of the POMS: Summary of Paired-Sample T Tests of Means

Assessment Points Compared	t	df	Sig. (2-tailed)	Effect Size ($\hat{\omega}^2$)
Onset to Recovery Midpoint	2.01	4	.12	.23
Recovery Midpoint to Med. Clearance	-1.18	4	.31	.04
Med. Clearance to 1st Practice	1.87	4	.14	.20
1st Practice to 3rd Practice	2.56*	4	.06	.36
Onset to 1st Practice	-.09	4	.93	.05
Onset to 3rd Practice	1.15	4	.31	.03
3rd Practice to 7th Practice	.00	4	1.00	.00
Onset to 7th Practice	2.36*	4	.08	.31

*Significant at $p < .10$

Figure 8. Injured athletes' POMS' anger, depression, and tension subscale score means at each assessment point.



Changes in depression along assessment points during the study were not found with the exception of two comparisons, the first practice to the third practice (see Tables

15 and 16). Participants were less depressed just prior to the third practice in comparison to prior to the first practice session, $t(4)=-2.24$, $p=.09$, $\hat{\omega}^2=.29$. Comparison of injury onset to the seventh practice session showed depression significantly decreased during the course of the study, $t(4)=2.21$, $p=.09$, $\hat{\omega}^2=.28$. The calculated effect sizes for these statistics suggested that with a larger sample size results for depression during recovery will be similar to these findings. However, the line graph of depression means (see Figure 8) provides a clearer picture of fluctuations in depression over time for this study. Similar to the changes in anger, athletes' levels of depression were highest at the onset of injury and just prior to the first practice session.

Table 15

Depression Subscale of the POMS: Means and Standard Deviations

Assessment Point	Mean (N=5)	Std. Deviation
Onset	7.00	7.07
Recovery Midpoint	4.60	4.93
Med. Clearance	5.40	5.77
1st Practice	7.20	6.14
3rd Practice	5.20	6.14
7th Practice	3.60	4.98

Table 16

Depression Subscale of the POMS: Summary of Paired-Sample T Tests of Means

Assessment Points Compared	t	df	Sig. (2-tailed)	Effect Size ($\hat{\omega}^2$)
Onset to Recovery Midpoint	1.60	4	.19	.13
Recovery Midpoint to Med. Clearance	-1.37	4	.24	.08
Med. Clearance to 1st Practice	-.96	4	.39	.01
1st Practice to 3rd Practice	2.24*	4	.09	.29
Onset to 1st Practice	-.12	4	.91	.01
Onset to 3rd Practice	1.07	4	.35	.01
3rd Practice to 7th Practice	1.97	4	.12	.26
Onset to 7th Practice	2.21*	4	.09	.28

*Significant at $p < .10$

Participants reported they were most tense just prior to their first practice session after full clearance than at any other point in the study (see Table 17). However, they were significantly more tense prior to the first practice than prior to the third practice, $t(4)=2.50$, $p=.07$, $\hat{\omega}^2=.34$ (see Table 17). Also, fluctuations in tension seemed to undergo changes similar to that of anger and depression (see Figure 8).

Table 17

Tension Subscale of the POMS: Means and Standard Deviations

Assessment Point	Mean (N=5)	Std. Deviation
Onset	6.40	5.32
Recovery Midpoint	5.60	5.13
Med. Clearance	5.80	5.07
1st Practice	7.40	5.08
3rd Practice	4.20	5.17
7th Practice	3.60	4.34

Table 18

Tension Subscale of the POMS: Summary of Paired-Sample T Tests of Means

Assessment Points Compared	t	df	Sig. (2-tailed)	Effect Size ($\hat{\omega}^2$)
Onset to Recovery Midpoint	.83	4	.46	.03
Recovery Midpoint to Med. Clearance	-.20	4	.85	.09
Med. Clearance to 1st Practice	-1.14	4	.32	.03
1st Practice to 3rd Practice	2.50*	4	.07	.34
Onset to 3rd Practice	.77	4	.47	.04
3rd Practice to 7th Practice	.67	4	.53	.04
Onset to 7th Practice	1.31	4	.26	.07

*Significant at $p < .10$

Table 19

Pearson Correlations of Anger with Depression, Anger with Tension, and Depression with Tension

Assessment Point	Correlated Mood Variables					
	Anger with Depression		Anger with Tension		Depression with Tension	
	r	p	r	p	r	p
Onset	.67	.15	.78*	.07	.62	.19
Recovery Midpoint	.86*	.06	.89*	.05	.80	.10
Medical Clearance	.87*	.06	.99 [‡]	.00	.90 [‡]	.04
1st Practice	.94 [‡]	.02	.90 [‡]	.04	.94 [‡]	.02
3rd Practice	.98 [‡]	.00	.95 [‡]	.01	.91 [‡]	.04
7th Practice	.91 [‡]	.03	.92 [‡]	.03	.94 [‡]	.02

*Significant at $p < .10$; [‡] Significant at $p < .05$

Because of the similarities in injured athletes' anger, depression, and tension levels during recovery and upon return to practice, Pearson correlations for these variables were conducted (see Table 19). The three mood variables were significantly

correlated throughout the assessment period with two exceptions: (1) depression and anger were not correlated at injury onset, $r=.67$, $p=.15$, and (2) tension and depression were not correlated at injury onset, $r=.62$, $p=.19$.

Summary. Mild confusion and fatigue were exhibited by injured student-athletes throughout the assessment period of this study. They maintained a high level of vigor despite their physical state which did not fluctuate as athletes progressed through recovery and returned to sport. Fluctuations in injured athletes' anger, depression, and tension were detected and the pattern of change for these moods were found to be correlated.

The Iceberg Profile

In a study of world class middle distance runners and marathoners, and college middle distance runners, Morgan and Pollock (1977) found these three groups did not differ significantly from each other on the POMS subscales. In addition, the mood states of runners were quite similar to high-level athletes in wrestling and crew. However, high-level athletes (runners, wrestlers, and oarsmen) scored appreciably below the college mean for tension, anger, confusion, fatigue, and depression, and above the mean for vigor. Morgan (1974) described the observed psychometric configuration as the "iceberg profile." Because Morgan and Pollock achieved a sample size of eight college middle distance runners which was similar to the sample size of this study, comparisons of injured athletes to non-injured athletes' POMS raw score means were conducted. The purpose of such comparisons was to find if injured college athletes exhibited a mood state iceberg profile similar to that of their uninjured peers.

Graphed comparisons of injured athletes' POMS subscale raw score means at each assessment point with that of college middle distance runners revealed the iceberg profile holds for injured college athletes (see Appendix L, Figures L1-L6). However,

injured athletes' iceberg configuration is noticeably depressed from their uninjured peers (see Figures 9 and 10). Injured athletes' tension and vigor remained consistently lower than college runners by as much as 6.3 and 9.3 mean points respectively (see Table 20). Although depressed from the college runners' mean, injured athletes' depression expressed little change throughout recovery until the seventh practice session where it was at its lowest. The presence of injury seemed to have reduced athletes' tension. Tension below that of their uninjured peers may be the result of factors such as a seemingly competent diagnosis and treatment guidelines, and mandatory time off (at least seven days) which served to relieve athletes' concerns regarding his/her injury.

Table 20

Comparative List of Raw Score Means for Injured Athletes at the Study's Assessment Points with College Middle Distance Runners

POMS Factor (subscale)	Onset (N=5)	Rec. Mdpt. (N=5)	Med. Clear. (N=5)	1st Prac. (N=5)	3rd Prac. (N=5)	7th Prac. (N=5)	College Runners (N=8)
Tension	6.40	5.60	5.80	7.40	4.20	3.60	10.90
Depression	7.00	4.60	5.40	7.20	5.20	3.60	6.90
Anger	7.60	4.40	5.00	7.80	4.40	4.40	8.10
Vigor	9.80	10.60	12.00	10.60	10.20	12.00	21.30
Fatigue	4.00	5.20	6.20	3.20	4.60	4.40	7.90
Confusion	6.00	6.40	6.00	6.00	5.60	5.20	7.60

Figure 9. Example 1: Comparison of raw score means for injured athletes at injury onset with college middle distance runners on each subscale of the POMS.

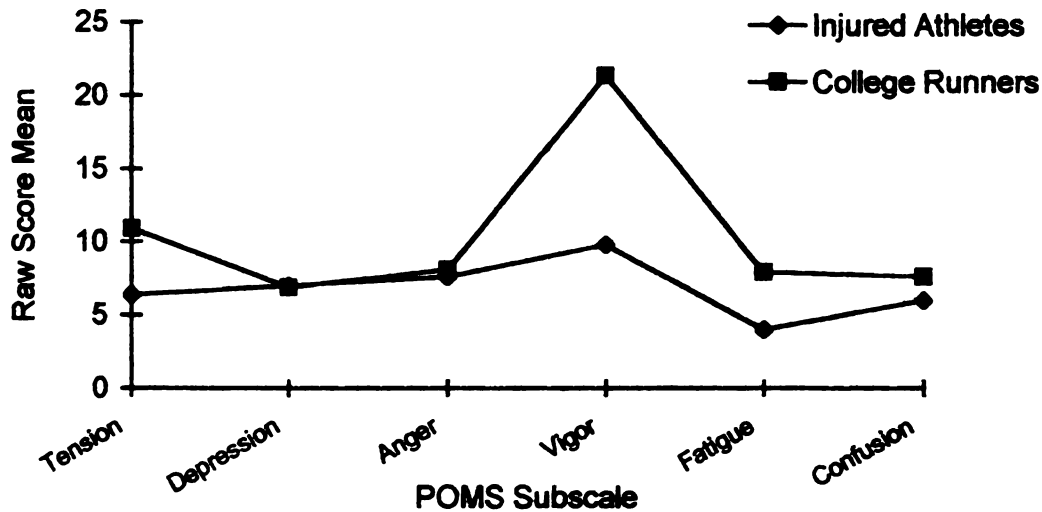
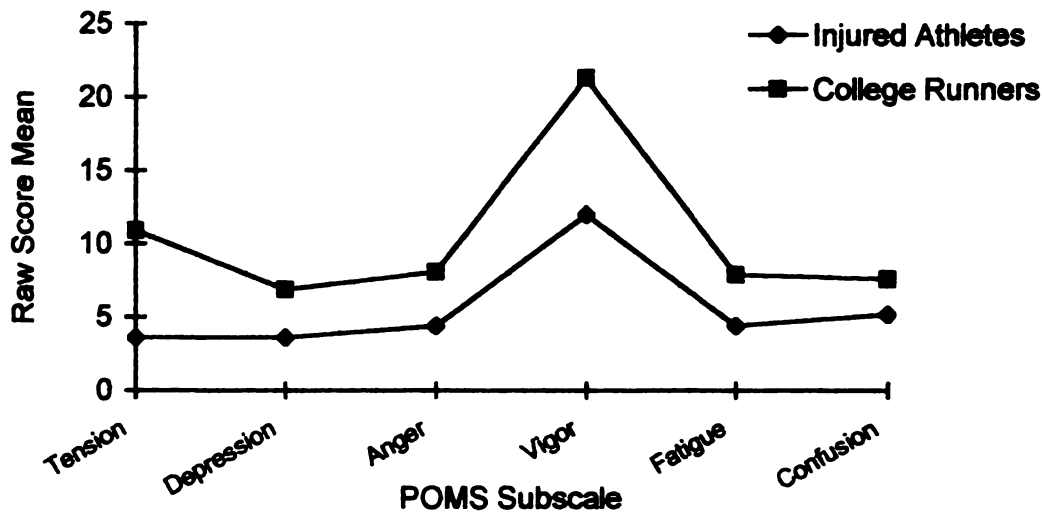


Figure 10. Example 2: Comparison of raw score means for injured athletes at the 7th practice with college middle distance runners on each subscale of the POMS.



Also of concern, injured athletes' vigor remained relatively constant, but well below that of college runners throughout the study. Perhaps this variable was affected by athletes' perceived percent healed, an indicant of their physiological state. Appendix M provides descriptive tables and graphs of individual injured athlete's treatment

confidence, self-confidence, and perceived percent healed at the various assessment points during the study. Interestingly, change in self-confidence was proportional to athletes' perception of the injuries' recovery. All but one athlete believed his/her injury was one hundred percent healed by the seventh practice session after full medical clearance. Perhaps perception of physiological state, along with other factors, interfered with athletes' ability to feel as vigorous as their uninjured peers.

Summary. Morgan and Pollock's (1977) iceberg profile of mood states was found for injured athletes. Injured athletes' profile was noticeably depressed from their uninjured peers. In particular, injured athletes' tension and vigor score means were noticeably less than their uninjured peers.

Part II: Results of Qualitative Interviews

The quantitative methods used in this study provided information regarding fluctuations in athletes' confidence and mood during recovery from severe injuries and compared their mood states to Morgan and Pollock's (1977) non-injured sample. While the purpose of the quantitative methods was to provide a basis for predicting changes in athletes' treatment confidence, self-confidence, and mood state during recovery and upon return to practice, gaining a greater understanding of elements that influence the status of these variables was also of interest. The purpose of the following section was to present information gained from injured athletes through interviews. Specifically, the objective was to determine the factors injured athletes attributed to the enhancement and maintenance of confidence during recovery. Their responses have been broken into four thematic areas: (a) response to injury, (b) coping and social support, (c) views of physicians and athletic trainers, and (d) concerns about returning to sport. Because of the small number of participants, measures have been taken to protect identities and maintain confidentiality.

Response to Injury

Easterbrook (1959) suggested that the effects of physiological arousal impair performance through a loss of perceptual sensitivity by interfering with one's capacity to process information. The stress and injury model (Williams & Andersen, 1998) proposed that athletes with a history of many stressors, personality characteristics that exacerbate the stress response, and few coping strategies may be more likely to appraise a stressful situation as such and exhibit greater physiological activation and attentional disruptions. The severity of an athlete's response to stress predisposes him/her to greater injury risk. Perceptions of the type/conditions (e.g., good, bad, ordinary) of the practice or competition in which the injury occurred may be helpful in

understanding their responses to injury. When asked if he/she was having a good practice or competition when the injury occurred, one athlete responded in the negative:

No, it was my worse game, out of eight games. That was my worst game. I wasn't scoring. I think I only had four points. I didn't really rebound. My defense was off.

However, others did not share this athlete's response in the study. In fact, one athlete believed herself to be enroute to a personal record at the time of injury.

My first jump that I fouled was probably ___ feet and my farthest jump is ___ coming out of high school. So I don't think it was a really big day, but it was getting better than what I usually do.

Another athlete believed the practice session was nothing out of the ordinary, but noted requiring extra warm-up time before being able to complete fundamental skills to satisfaction.

Well, it was our first event and you're usually really cold, but we just did our whole warm-up that we do every day and stretched out. Then I got up on the [the apparatus] and I warmed up. Then I did my first pass. We had to stick three of them before we could go on and I probably had to do six of them because I was a little off. We had to make them perfect so I think I was warmed up enough... Yeah, [the practice session was] typical. Not good or bad, kind of neutral.

Oftentimes, severe injuries are acute in their onset, occurring in an instant. For these athletes, recalling the conditions of the practice session at the time of injury can be easy. Their thoughts and feelings at the moment of injury can be recalled instantaneously with great clarity. When asked what went through their minds at the time of the injury, athletes first spoke of the pain they experienced.

I couldn't breath. I didn't think, "I'm injured. I'm gonna be out." I was thinking, "Just get me up from here. Get me [out of here]." I wanted to lay down and go to sleep. I didn't want to be anywhere. I wanted to be anywhere else but where I was really at... I just didn't want to be there.

Another recalled instantly assessing the severity of the injury.

I tore my ACL. As soon as I rolled onto that foot and my knee went sideways, I watched it and I heard it and I saw it go sideways. I remember that's how the other people said that they did theirs. I had a really bad feeling when it hit that's what happened... I thought I hurt it really bad because I couldn't move it or anything. So, yeah, that's the first thing I thought about, it's gone.

While acute injuries produce instant thoughts and judgments, chronic injuries may not have a recognizable moment of onset or provide a special moment for instant judgments. Instead, these athletes may participate in a number of practices and competitions where they appraise the quality of their performance, and judge the severity, type, and possible treatment of their injuries. This was one athlete's experience:

Um, well, depending day to day, sometimes it [the injured area] is fine and when it was hurting me most then I had to stop or just do a little bit less... I was just hoping that it wasn't anything that would get worse, that it would get better, go away eventually, but it didn't.

The athletes spoke of many reactions to their injuries including anger and frustration. None of the athletes denied they were injured, however, it was not uncommon for them to maintain hope that the injury was not as severe as initially assessed (by self, athletic trainers, or physicians). For those with chronic injuries, the period of hope was more extensive than those with acute injuries.

Coping and Social Support

Athletes who injured themselves while participating in sports may undergo a variety of emotional responses. Because injury may have different meanings to athletes, many of which are unsettling, athletes may seek support from family, friends, teammates, coaches and medical professionals (e.g., team physicians, athletic trainers, and sport psychologists). Gould et al.'s (1997a) investigation into the types of social support injured athletes seek has provided a bounty of information important to the

enhancement of athletes' recovery, both physical and psychological. Central to understanding athletes' psychological needs at the onset of injury is knowing whose support athletes initially seek and what these persons provided. The participants in this study almost unanimously reported that they called their parents, or a particular parent, as soon as possible after becoming injured or after diagnosis of injury. Four (2 females, 2 males) of the six athletes in the study reported calling their mothers. One female athlete sought to speak with her father after becoming injured. A final participant expressed apprehension in reporting her injury to either parent.

Parents facilitated a number of roles such as caregiver, an "emotional sounding board," and, in some cases, an authority within the sport. As one athlete said:

Well, [my father] was my high school coach so he understands. If I'm crying, he's my father, so he understands me. But as a coach, he has to tell me what I was doing wrong, that this is an injury and it's something that happened... There was nothing I could do to take it back. Basically, he said, "You got to get your knee together and you got to start jumping."

In the cases of chronic injuries, athletes kept their parents abreast of the progress they had made in obtaining a diagnosis and a treatment plan for their injuries. Parents were also actively involved in assisting athletes in making decisions about accepting suggested treatment. In the following statement, an athlete expressed her mother's concerns regarding injury diagnosis.

[My mother] had been wanting me to get the bone scan for a long time, because she is always worried about it. She doesn't like it that I get injuries. [The doctors and trainers] made me wait so long to get a treatment like the bone scan. They make you wait forever. Like I could have gotten it, but they were waiting until after Thanksgiving. They wouldn't do it right away. So then I ended up with another week off because of that and [my mother] was happy that I was going to get it.

However, when athletes believed their parents were invested (i.e., emotionally, financially) in the athlete's status within the sport, athletes tended to avoid informing

parents of their injury in fear of their response. One athlete, in particular, sought emotional support from her boyfriend before disclosing the injury to parents.

I called my boyfriend right away and he already knew about it obviously... So, he came over and sat with me while I called my parents... I didn't want to call them, but I had to. When [my teammate who had a similar injury] called her parents, her mom cried and all this stuff. So I'm like, "Oh no, this is terrible," because I got my bike stolen that day and I had to tell them that too... So I told my dad and he was like, "Ooooh." So he asked me all these questions, all these questions, all these questions. Then my mom came in and I told her. They were really good about it. They did not get really upset. I'm sure they're completely disappointed.

According to Gould et al. (1997b), the largest stress sources athletes with injuries requiring longer rehabilitation periods encounter during recovery are psychological and social concerns. When an athlete is not able to perform difficult tasks they have trained years to perform and are limited to performing finer, less-involved tasks designed to regain strength and agility, it is not uncommon for feelings of inadequacy and isolation to develop. Furthermore, when athletes' perceive their parents' disappointment in the injury's occurrence and timely rehabilitation process, athletes become reluctant to seek their support. Later in recovery, when asked whom she talked to most about her injury, the athlete who showed concern for her parent's involvement in the sport reiterated her reluctance to seek support from her parents.

I just talked to my parents last night because we were talking about how I'm improving now and how I am able to do more [sport related skills]. And they're reacting to every little thing. They weren't really attentive at all when I was doing little footwork and stuff like that.

At the onset of injury, athletes initially sought emotional support from their parents for a variety of reasons. However, during recovery, participants sought support from friends, family members, and teammates, many of whom had experienced their own athletic or similar injuries. "Mastery experiences are the most influential source of efficacy information because they provide the most authentic evidence of whether one

can muster whatever it takes to succeed," (Bandura, 1997, p. 80). However, when athletes encounter their first severe injury or a different type of injury, as was the case with this group of participants, mastery experiences in the rehabilitation of these injuries do not exist. In the absence of personal experiences, athletes engaged in communication with individuals who had experience with similar injuries. Their teammates, friends, and family members comforted athletes' uncertainties regarding medical and treatment procedures, progress, expectations, and physiological states (i.e., pain, discomfort, numbness). Research (Flint, 1991; Gould et al., 1997a) has reported that having other athletes who had previously been injured act as models or references has been found to be a factor which enhanced athletes' recovery from severe injuries.

Gould and his colleagues (1997a) also reported that a significant percent of the athletes in their study mentioned that support from coaches and teammates were facilitating factors in their recovery. Support such as coaches and teammates' interest in the athletes' general welfare and rehabilitation program and special assistance upon return to competition were perceived as facilitative. While coaches and teammates are considered as social supporters in general, their role in facilitating injured athletes' perceptions of their physical state, confidence in sport abilities, and placement on the team are apparent. Because coaches' and teammates' responses to an athlete's injury may influence his/her psychological response to injury and rehabilitation, questions targeting athletes' perceptions of teammates' and coaches' responses were given during interviews. At the onset of injury and during recovery (before medical clearance to return to practice), athletes commented very little about their coach's response to the athletes' injury. Coaches seemed "matter of fact" and inquired about their athlete's status during recovery, however it was not uncommon for athletes to recognize their

coach's disappointment in their having been injured. One athlete vividly recalled her coach's reaction when informed of the severity of the athlete's injury:

I started tearing a little bit and getting mad after that because there was no more hope... My coach started crying because she heard about what happened. I just feel like if I act better about it then they will too.

Some athletes did not find interactions with teammates to be beneficial during recovery. One athlete stated his teammates' humorous comments regarding his injury sometimes "hurt," but these comments served as incentive to continue the rehabilitation and return as soon as possible to sport participation. However, teammates' responses to injured athletes can be more damaging.

This is the first time I've done anything big since the surgery. The thing is, I am completely supportive of them and I'll cheer for them everyday and help them move equipment and do everything. And when I [practice], they're all on the other side of the gym... I understand because I've been there my whole life. Being in a pressure situation where they have to concentrate. And I completely understand that, but it's just the way it went yesterday. I expected a little bit more.

One's ability to contend successfully with injury is not limited to support gained from persons significant to their emotional and physical well being. In fact, athlete's interactions with important others during recovery may be negative. While research with bereaved and patient populations indicated that positive interactions with social supporters are typically reported more frequently than negative interactions (Dakof & Taylor, 1990), research conducted in the athletic setting (Udry, Gould, Bridges, & Tuffey, 1997) found a significant number of negative interactions. In light of this, it is important that athletes recognize potential resources for coping besides social support. Because of this, athletes were asked general questions about how they cope/deal with their injuries including how they kept their mind off their injury and what kinds of things they do to handle the fact that they are injured. Some athletes were able to remain focused on recovery and looked forward to returning to sport participation.

I don't [keep my mind off the injury]. No, I don't. Every time I walk I have to think about, "Okay, I'm hurt." So there's really no way to keep my mind off it. It's something I have to deal with... I'm injured and I'll be back.

Others in the study were impatient. When asked how he/she copes with being injured,

one athlete stated:

It is hard. Like I just asked my coach today, what am I supposed to do? I need to be doing mileage. We have a meet in a month and a half and if I don't start running now, I'm not going to be ready for it... It is just hard to sit there when you see everybody else run. It is just hard to watch them, especially when it doesn't hurt that bad. You feel like you can run through it, you know.

However, attempts to avoid thinking about the injury were common among the athletes.

I guess I don't really cope with [the injury]. I just try to ignore it. I mean, it is hard because all of my roommates are on the team. And it's hard when they are doing everything else... My roommate just got over [an injury]. We've always wanted to [workout] together but one of us is always hurt and out and the other one is healthy.

One athlete believed thinking of others was a good way to cope with an injury.

Well, I really feel like there is nothing you can do about it at this point. I mean, it happened. I have to deal with it now and that's pretty much my attitude. I need to keep everyone else's attitude up, you know, positive, not just about me, but about our team and about I'm going to be fine and they're going to be fine. I'm helping them to have a better attitude so maybe they'll help me when I'm having a hard time... There's nothing you can do to make myself feel better. Everyone always says, if you don't feel good about yourself, try doing something good for somebody else and you'll make yourself feel better and that's what I'm trying to do.

Coping strategies are an important factor in athletes' response to injury and rehabilitation (Wasley & Lox, 1998). While certain coping strategies may enhance adherence to rehabilitation, research (Shuer & Dietrich, 1997; Wasley & Lox, 1998) suggests the type of injury (chronic or acute) may differentially affect athletes' coping behavior. Both studies reported that chronically injured athletes sought social support less and engaged in more avoidance behaviors than comparison groups. These findings suggest, first, that athletes with chronic (i.e., overuse) injuries cope with injury

differently than those with acute injuries. Second, while some attention has been focused on psychological intervention for acutely injured athletes or those who have undergone surgical treatment, the psychological and emotional needs of athletes struggling with chronic injuries also appear to merit consideration (Shuer & Dietrich, 1997).

To gain further understanding of athletes' sources for coping, they were asked what keeps them going in the face of tiresome and painful rehabilitation. Enjoyment and passion for their sport and regaining physical abilities was commonly stated among the athletes. However, one athlete eloquently expressed a feeling commonly shared by the others when she credited her parents, coach, and trainers by stating, " Just to know that somebody cares about me feels good."

Perception of Physicians and Athletic Trainers

Because enhancing one's physical status is one of the major ways to alter confidence (Bandura, 1977, 1997), it is expected that athletes' gain confidence (in self and treatment) and judge the effectiveness of team physicians and athletic trainers by assessing their rate of improvement in injury status. The graph of injured athlete's treatment confidence, self-confidence, and perceived percent healed showed a positive linear relationship between the three variables (see Figure 4). However, correlation analysis of treatment confidence with perceived percent healed and self-confidence with perceived percent healed (see Table 8) revealed that (a) perceptions of percent healed were not significantly correlated to treatment confidence, (b) perceptions of percent healed were not significantly correlated with self-confidence during recovery (time spent away from team practice), and (c) self-confidence was significantly correlated with perceived percent healed once injured athletes received medical clearance to return to practice. To gain greater understanding of injured athletes' perceptions of the medical

treatment provided by the sportsmedicine staff (i.e., physicians and athletic trainers), the interviews included questions (see Appendix G) which lead to the disclosure of factors injured athletes believed contributed to shifts, maintenance, and enhancement of self-confidence and treatment confidence during rehabilitation and upon return to practice.

While the participants reported improvement in their physiological state, self-confidence, and treatment confidence over the course of the study, their responses to questions pertaining to medical treatment were variable. In general, the athletes believed the physicians and athletic trainers were concerned and cared about their progress. Athletes also believed they received adequate information regarding injury diagnosis and subsequent treatment and were kept abreast of their progress during recovery. In support of the quantitative data analysis, athletes reported that perceptions of their physiological state were an important factor for judging the effectiveness of their rehabilitation programs.

So far, [the rehab] has done a really good job with me. But I think my attitude has a lot to do with it too. She is really supportive, my trainer. The doctor was talking to [my trainer] about how I could start [practicing] and stuff. [My trainer] told me later she couldn't believe I actually got [the doctor] to say yes, that I can actually do this stuff. That's how well I'm doing. I'm probably a week ahead... I could not have done it without [my trainer].

It is not unusual for the student-athlete to certified athletic trainer ratio to be profoundly disproportionate at institutions with large athletic programs. In response to this disparity, student-trainers are often assigned to care for athletic teams and act as liaisons between athletes and head trainers. Athletes' confidence in their student-trainer's competence may also influence treatment confidence. Athletes in this study were comfortable with the instrumental role of student-trainers and believed the head trainers were aware of athletes' physical condition.

I'm very confident in [my student-trainer] She knows she's learning. But the head trainer works with me also. So what [the student-trainer] doesn't know, [the head trainer] will come in and say this is what you both should know. So yeah, everybody is getting to know what to do. [The student-trainer] is finding out what to do, but there's always someone over her shoulder making sure she's doing the right thing.

When asked about their expectations of the physicians and athletic trainers, the athletes in the study expected a "reliable diagnosis" and treatment "to get it better."

While they believed the trainers and doctors met their expectations, athletes were not always satisfied with their rate of progress and expressed feelings of helplessness and confusion. Athletes' less-than-positive responses regarding the effectiveness of the treatment would not be surprising to researchers who investigate athletes' response to chronic injuries. Chronic injuries are difficult for athletes to tolerate. Because the injury worsens with time and there are usually no physical manifestations for the injury (i.e., acute trauma), athletes may, at times, question whether they are really injured (Shuer & Dietrich, 1997). In addition, chronic overuse injuries do not always respond to conservative treatment (Heil, 1993a), and in instances where the injury responds to treatment they usually require an extensive recovery period away from sport participation. The following three statements are expressions of concerns regarding treatment and care athletes have when recovering from chronic injuries.

They are [meeting my expectations]. I don't know what else it could be either and I don't know what else you'd be able to do for this kind of injury. They are doing what they should do. It is just not helping... I can run three miles and it hurts after a mile. Tomorrow, I could go running and it not hurt again.

Another athlete's expectations of participating in sport without continued pain in the injured area was met, however s/he remained objective.

It didn't eliminate the pain, but [the treatment] made it less. So it's easier to work with and I can actually get through a full practice now... I don't think the pain's ever going to totally go away, but it's something that I can live with and deal with.

Only one athlete expressed mistrust in the medical staff's ability to diagnose an injury.

I don't know. I guess right now I feel they are right, but in the past I haven't trusted what they said. When I had [a previous injury] I went and saw so many different doctors here because no one could tell me what it was. I was off for a whole year because nobody knew what it was here. And they all would say it was something different. I finally went to a doctor at home and he fixed it... I'm trusting [the team physicians] now again because it seems that this is an easier thing to diagnose.

Accurate diagnosis of chronic injuries is oftentimes difficult for physicians and athletic trainers because these injuries may not be detected through conventional (i.e., manipulation) and more extensive (i.e., MRI, bone scan, X-rays) tests. Matters such as ambiguous diagnoses of chronic injuries and uncertain expectations of treatment may render athletes vulnerable to a prolonged stress-response with traumatic psychological ramifications worthy of intervention.

The analysis of questionnaire data (see Figures 4 and 5) showed that the athletes in this study maintained moderately high confidence in the medical staff's ability to return them to an equal quality of performance acquired prior to injury. While this sentiment was expressed throughout their interviews, the athletes reported concern regarding diagnosis of chronic injuries and uncertainty in expected recovery time. Although some attention has been focused on psychological intervention for athletes with acute injuries and injuries requiring surgery, it appears that athletes who struggle with chronic injuries may also benefit from similar services.

Concerns when Returning to Sport

Similar to the reports of previous research (i.e., Chan & Grossman, 1988; Gould et al., 1997b; Shuer & Dietrich, 1997; Smith, A.M. et al., 1990, 1993; Wasley & Lox, 1998), this study's participants expressed concerns about social issues (i.e., feelings of isolation), fear of reinjury, and losses (i.e., hopes and dreams, missed opportunities) in

interviews conducted during recovery. However, returning to sport participation after recovery from severe injuries may also be stressful to athletes and create a window of entry for self-doubt and lapses in physical self-confidence. Because there is potential for increased mood disturbance and decreases in confidence once athletes receive medical clearance to return to practice, it is important to determine issues (e.g., stressors, hindering factors, constraints) which may confound or complicate this progression.

After their first practice, it was not uncommon for athletes to report having experienced a mixture of emotions including discouragement, frustration, and annoyance. "I'm in an emotional state lately. Probably because I'm getting back into it and I'm scared and excited," stated one athlete. Pain commonly accompanied the first practice session as one athlete recalled, "Well, right now, [the pain] is still there, and I thought it was supposed to be gone by the time I came back." Others were concerned with their overall physical conditioning in comparison to their teammates and placement on the team.

I'm just worried that they've been all training. They've already had two weeks on me, you know... I just feel like I'm behind. And I don't want that. I want to be able to do the workouts the same as them; I want to be where they are when we start meets and everything... I want to make sure I can travel.

Another athlete expressed similar concerns regarding physical conditioning.

Right now I'm not as confident because I haven't been working on my game. When I first came back, I ran up and down the court one time and I was dead tired. That was the major thing. I have this brace to protect me from almost anything so I wasn't really worried about my [injury]. It was mainly just conditioning and being able to get back into the flow.

Athletes also expressed concern for their teammates' upon their return to practice and competition.

I will be ready, but it's just that if I'll break up the lineup. We have had a set lineup for the whole year and I've only competed once... Sometimes I think it's not fair for me to just jump into the lineup when everyone else has been competing all year. Especially when they had their spot all year. All of a sudden, I'm just gonna come in and kick them out. If I were in their position, I wouldn't like it.

Recovery from severe injuries requiring considerable time away from practice and competition does not come to a sudden halt when an athlete returns to practice. Injury rehabilitation (i.e., pre- and post-practice treatment, strengthening routines) may continue for weeks, months, and possibly, years after returning to full participation in sport activities. While it is apparent that student-trainers play a valuable and integral role in the physical recovery of injured athletes, they also serve as a source for enhancing athletes' psychological recovery. Anticipation of personnel changes may affect athletes' decisions regarding treatment and response to rehabilitation programs.

I talked to my coach yesterday and I said, well, if I needed surgery I wanted to get it soon because I don't want to wait for a month or six weeks...my trainer is gonna leave in May. She's a really good trainer and I want to be rehabed by her... I'll be doing a lot of stuff with her support, but when she leaves, Dr. ___ will be here to tell me how I'm doing, I guess. But on the day-to-day basis, I don't know. I know we're gonna have another person, but I don't know who that's going to be.

When asked which aspect, physical or mental, was more difficult to contend with upon return to practice, responses were mixed. This participant quickly expressed concern regarding loss of physical conditioning by stating:

Hardest thing? I couldn't jump. I lost it. I lost all my hops. When I got back, I couldn't jump on my right leg...I got to keep working on it.

Another athlete expressed similar concern for her physical condition upon return to practice:

Um, trying to sort of catch up with the things you've missed while everyone was working out and getting better and you were doing nothing. I guess that would have to be it.

However, psychological/mental struggles upon return to sport participation were also reported. One athlete had this to say on the matter:

Mental. Because just the part where I don't like to hear people talking about their race. I had this whole month where I was just focussing on my running and what I wanted to do. You get back here and everybody is talking about competing against everybody else and I just don't... I don't like talking about all that. So it's mentally difficult to be back here and have to hear all this stuff again.

To demonstrate athletes' difficulty in differentiating between the physical and mental hardships of returning to sport participation, during the final interview one athlete stated his concerns regarding reinjury, physical conditioning, and decreased self-confidence.

I'm starting to get over it but I guess always being worried about my knee when I'm playing, I might twist it again and hurt it. The doctor said it was a freak thing, how it happened, and for it to happen again it would have to be another freak accident. I have to get that out of my mind. Right now, I'm not as confident because I haven't been working on my game. When I first came back, I ran up and down the court one time and I was dead tired. That was the major thing. I have this brace that will protect me from almost anything so I wasn't real worried about my knee. It was mainly just conditioning and being able to get back into the flow.

While determining which aspect, physical or mental, was more difficult to contend with upon return to practice, determining the most positive and negative aspects of the injury experience was not easier for the participants. Questions requiring reflection on their experience as an "injured athlete" were given toward the end of each interview session. Finding one positive aspect about being injured caused athletes to give a long pause before answering. Gaining a chance to rest was a common response. This athlete saw the rehabilitation period as time to recover from all other injuries when she stated, "I got to rest the rest of my body, take some time off so that everything else could

heal." However, the most insightful response was given by an athlete who described the break from sport participation as an opportunity for self-reflection:

I think sitting out gave me a chance to look at, or maybe feel what would I do if I didn't have [my sport]. So I think now I'm working even harder than I did when I first got hurt... You gain a different perspective.

While finding one positive aspect about being injured was difficult, determining the most negative aspect of being injured was no easier for there were so many to choose from. However, one athlete was able to sum up the groups' response best:

There are so many. Don't feel like you are a part of anything anymore. That it takes a lot to get back. I mean, a lot, both mentally and physically. I couldn't keep up, you know. I couldn't, can't run on your leg and have to take all that time off. That really sucks.

Finally, when athletes were asked to reveal one aspect learned while injured and recovering that they would like to share with other athletes (to help them under similar circumstances), a mix of responses were given ranging from cortisone injections are "not really a big deal" to consider gaining a second opinion when faced with ambiguous and uncertain diagnoses. However, one of the most memorable and poignant responses was:

I learned you get taped before every practice. On the day I got hurt, two guys on the team asked me if I was getting taped. I usually didn't because, coming from class, I am late for practice. And they asked if I was getting taped. I said, "Naw, I ain't getting taped." Another guy asked me if I was getting taped. He said I should get taped. I said, "I'm alright." The day I got hurt, I went out there and two plays later I was sitting on the sidelines. So, I'll tell them to get it taped. Get taped and listen to what the trainers have to say.

Summary. The participants in this study reported a variety of initial responses to their injuries. In general, they were angry and frustrated at the onset of injury, however, the type of injury, acute or chronic, influenced their psychological and emotional response to the injury. Acute injuries that are sudden in their onset invoked feelings of anxiety, panic, and instant evaluation of the injury situation. Athletes with chronic injuries

described feelings of bewilderment and confusion because there was not a clear instance of the injury's onset.

Participants' coping abilities were assessed by examining their social support networks and general coping strategies. At injury onset, the athletes sought comfort and advise from their parents as quickly as possible. However, when an athlete believed his/her parents are invested in the athlete's continued participation in sport, apprehension in seeking parental support was experienced. The athletes also sought information regarding their injury from friends, family members, and teammates who had similar injury experiences and from their athletic trainers and team physicians. The athletes also reported that feeling as though someone cared about them and their welfare and that there was a place on the team for them upon return to sport were important to their ability to cope with the injury situation.

The medical staff (team physicians and athletic trainers) was perceived as knowledgeable and caring by the participants. Athletes expected reliable diagnoses and treatment for recovery that permitted a return to an equal quality of play acquired prior to injury. However, slow progress during recovery, continuous pain and discomfort, and setbacks common in the treatment of chronic injuries may lead to mistrust in the medical staff's competency.

Upon return to sport participation after injury recovery, athletes expressed greater concern for the loss of physical conditioning, placement on the team, and reception from teammates in comparison to fear of reinjury. Turnovers in medical staff (i.e., change in athletic trainers) were a concern expressed by those with injuries requiring continued therapy long after returning to sport participation.

CHAPTER 5

DISCUSSION

Overview and Discussion of Results

The integrated model of athletes' response to sport injuries (Wiese-Bjornstal et al., 1998) outlines the numerous factors (personal and situational) that may affect athletes' ability to cope with the injury, recovery, and, if permitted, return to sport participation. Fisher (1990) identified self-confidence as a primary component in the rehabilitation process and that strategies promoting self-confidence can increase the likelihood of treatment adherence. Because confidence is not concerned with the skills an individual possesses but with the judgments of what an individual can do with the skills he/she possesses (Bandura, 1977, 1997), identifying factors influencing confidence during rehabilitation may expose the cognitions shared by athletes with severe injuries. Therefore, the purpose of this study was (a) to assess athletes' level of self-confidence in their ability to perform specific sport skills relevant to a typical practice session during recovery and upon return to practice, (b) to assess athletes confidence in the treatment they received for their injury, (c) to assess changes and/or fluctuations in athletes mood state during recovery, (d) to compare the mood state profile of injured athletes to Morgan and Pollock's (1977) non-injured sample, and (e) to identify individuals that injured athletes believe provided social support, the type of support those persons offered, and how the support was helpful to athletes' recovery and return to sport.

Belief in one's ability to perform specific and necessary rehabilitation and sport tasks, and belief in the treatment's ability to rehabilitate the injury effectively and return the athlete to an equal quality of play experienced prior to injury is derived from four principal sources of information: vicarious experience, verbal persuasion, prior recovery experience (performance accomplishments), and physiological states (Bandura, 1977, 1997). When returned to practice after recovery from injury, athletes may experience adverse affects such as movement limitations, pain, and fatigue that may be perceived by athletes as an inability to perform as well as prior to injury. Thus, athletes may experience decreased self-confidence in their ability to perform sport skills. Therefore, it was hypothesized that athletes with severe injuries will report lowest levels of self-confidence prior to the third practice session than at any other assessment point in the study. The following results were found from the data analysis.

Self-confidence. Athletes reported their lowest level of self-confidence at injury onset rather than at the third practice session as predicted. Lack of support for the research hypothesis may be attributed to the quality of the sources of information for building self-confidence experienced and reported by the study's participants. Athletes reported that they believed the prescribed treatment was appropriate for the care of their injury and that their physiological state improved over the course of time. Furthermore, athletes' perceptions of improvement in their physiological state during recovery may have contributed to the enhancement of confidence during assessment. In sport and physical activity, physiological information is an important source of efficacy (and confidence) information (Feltz & Riessinger, 1990). According to the integrated injury model (Wiese-Bjornstal, et al., 1998), an individual's perceptions of his/her physical recovery is continually appraised by the athlete. When injured athletes continued to perceive their injury as healing successfully coupled with reliable feedback from

competent sources, athletes' belief that they can execute specific activities within the progression of the typical practice session increased.

Furthermore, athletes' level of self-confidence varied more greatly at the onset of injury, however, variability in self-confidence levels decreased as athletes continued to recover and return to practice. At injury onset, variability in levels of self-confidence may be a result of the athletes' cognitive appraisal of the type and severity of the injury, the information they received (interpreted) from medical personnel, and the verbal and non-verbal responses generated by significant others (coaches, teammates, parents). When an injury that requires at least 7 days away from practice is more severe than another injury fitting this criteria (i.e., ACL rupture requiring surgery versus a second degree ankle sprain), an athlete's belief in a return of equal quality of physical ability enjoyed prior to injury may be more difficult to imagine. Hence, severity and type of injury may account for the variability within this variable at the onset of injury. However, correlational data showed that regardless of the injury's severity, as athletes perceived improvements in their physiological state (perceived percent healed) during recovery and experienced success in completing rehabilitation exercises, the opportunity to return to an equal quality of ability acquired prior to injury became more apparent. Thus, athletes' self-confidence increased and variability within athletes' level of self-confidence decreased so long as they perceived their injury to be healing.

Treatment Confidence. Study participants' confidence in the treatment's ability to return them to an equivalent quality of play acquired prior to injury was moderately high at injury onset and increased as athletes continued recovery and returned to practice. However, a look at individual athletes' treatment confidence revealed that some athletes experienced decreased treatment confidence during the assessment period. These findings may indicate that situational factors such as the type and severity of the injury

(i.e., acute-nonsurgical, acute-surgical, chronic) may affect athletes' beliefs regarding the quality of care they receive. Further consideration of these matters will be addressed in the next section of this discussion.

Mood States. Athletes with severe injuries in this study experienced significant fluctuations in their total mood disturbance, and more specifically, anger, depression, tension, and fatigue during the assessment period (injury onset to the 7th practice). While it is important to report that athletes' total mood disturbance was significantly greater at the onset of injury than at the 7th practice, it is more interesting to note the strong similarity in heightened total mood disturbance at injury onset and the 1st practice. Because the sources for enhancing self-confidence were effectively delivered during recovery, rather than affecting self-confidence, anticipatory feelings and fear of the unknown at injury onset and prior to the 1st practice session were more apparently expressed through total mood disturbance and physiological arousal. More specifically, athletes were significantly and similarly more angry, depressed, and tense at the time of injury onset and prior to the first practice session than at any other time during the assessment period.

Information gained through interviews regarding athletes' concerns about returning to sport did not include fear of re-injury. Instead, participants spoke of frustration regarding their lack of overall physical conditioning, concern for teammates' reaction to their return (shifts in structure/placement on team), and concern for their ability to remain mentally focused on continued recovery and regaining team status. These concerns affected their physiological and mood states. However, athletes remained confident that they were able to perform the specific sport skills relevant to the progression of a typical practice session.

Comparison of injured athletes' mood state factors to those of Morgan and Pollock's (1977) non-injured sample revealed that the Iceberg profile of the six POMS factors was present for injured athletes. However, athletes with severe injuries in this study expressed Iceberg configurations that were noticeably depressed from Morgan and Pollock's non-injured sample. These findings were similar to those found by Pearson and Jones (1992).

Although rehabilitation can be physically taxing, during interviews, athletes commonly reported that gaining a chance to rest was a positive aspect of being injured and away from practice. The amount of time (hours per week) student-athletes spend in sport preparation and competition, the physical demands of sport participation, and the responsibility to maintain academic status may be as or more taxing than maintaining full-time employment. When injured and removed from practice and competition, athletes may experience a sense of relief because their workload has been suddenly, and drastically reduced. Secondly, differences in the homogeneity of the two samples may have influenced the depressed findings. Morgan and Pollock's college sample of eight, male, middle distance runners was more homogeneous than the sample used in this study (males and females from different sports). Personality and temperamental differences in the athletes (given their choice of sport) may have influenced findings of depressed Iceberg profiles. The depression of injured athletes' Iceberg profiles in comparison to Morgan and Pollock's non-injured sample may have resulted from factors such as availability of rest and differences in homogeneity of samples. Although injured athletes' profiles were depressed, perhaps it is more important to recognize that their profiles remained similar in configuration to Morgan and Pollock's non-injured sample.

Social Support. Interviews with athletes revealed information for the enhancement of self-confidence and psychological and emotional support from a variety

of sources during recovery and upon return to practice. These sources included medical staff (physicians and athletic trainers), family members (parents), coaches, teammates, and friends. During the rehabilitation period (time away from practice), athletes received information to enhance their physical self-confidence from athletic trainers, physicians, and friends and/or teammates who had experience with the same or similar injuries. Emotional support was sought from parents, especially when the athlete's period away from practice was extensive (more than 2 weeks).

Considerations for Assisting Athletes with Severe Injuries

The results of this study revealed a great deal of athletes' concerns when recovering from injuries that require a significant time away from practice. This section of the discussion is devoted to further review of concerns athletes had regarding their injury that were not addressed in the first section of this discussion but came out in the data analysis and the implications for professionals who assist athletes with their recovery.

While the positive-linear correlation between perceptions of physiological states and self-confidence may seem simple in its statement, there are numerous variables that may affect injured athletes' perceptions of their recovery process. For example, the participants in this study believed the medical treatment they received was sufficient to produce the desired outcome, an equitable skill ability upon return to sport participation. However, in the absence of reliable treatment and diagnosis, and other relevant medical services, a similar correlation between the two variables may not be found. For instance, the participants in this study acknowledged concern for changes in medical personnel and issues specific to management of chronic overuse injuries.

At institutions with large sport programs, the use of student athletic trainers may be necessary. Changes in student trainer personnel may occur with the end of each

academic semester and year. For athletes whose injury rehabilitation extends beyond the stay of their assigned trainer on whom they may have come to rely and trust for technical information and psychological support, changing trainers during recovery may have negative repercussions for the injured athlete. Turnovers in athletic training personnel was a particular concern addressed by participants with chronic overuse injuries and injuries requiring surgery. Efforts to maintain consistency in medical provisions may mean that professional staff trainers need to be involved in rehabilitation for consistency. Similar consistent interaction with team physicians may also be important to the maintenance of athletes' proactive psychological state and confidence in the treatment's effectiveness.

The maintenance of participant's high treatment expectancy may be a result of the availability and quality of facilities, trainers, and physicians available at their institution. However, it is important to realize that colleges and universities with smaller athletic programs oftentimes do not have access to the care of injuries that were received by the athletes in this study. For example, in comparison to the treatment received for injuries during high school sport participation to the treatment received in college, a freshman athlete in the study stated that the two could not be equally compared. The seemingly competent physicians and trainers and the abundance of rehabilitation equipment available at his current institution was beyond anything he had experienced at any prior level of sport participation.

Because the availability and quality of sport injury care will vary across collegiate sport programs, treatment confidence and self-confidence results similar to this study may not be found in replicated studies. However, the unlikelihood of achieving similar statistical results should not discourage further investigation of athletes' perceptions of their medical treatment. Assessing athletes' perceptions of the treatment they receive

can assist in the evaluation of rehabilitation programs and facilities. Assessments may also provide an important understanding of the role that availability of sufficient treatment plays in athletes' psychological response to the injury, rehab adherence behaviors, and decisions regarding their future participation in sport and physical activity. However, while the type of medical care provided may have a significant effect on recovery behaviors and outcomes, it is also important to consider the type and severity of the injury as factors influencing athletes' perceptions of their recovery progress.

The best medical care and treatment cannot avoid setbacks in recovery. Recovery setbacks, continued pain and discomfort in the affected area, and uncertainty of injury diagnosis were concerns of athletes with chronic overuse injuries. According to Heil (1993a), generally, the more severe the injury, the greater the psychological and emotional costs. Furthermore, the more prolonged the recovery period, the greater the risk of chronic pain. Because diagnosis of chronic overuse injuries is difficult and treatment of chronic pain may be beyond the expertise of athletes' primary sportsmedicine providers, Heil (1993a) suggests referring athletes to those who specialize in the treatment of these injuries (i.e., osteopaethic physicians and pain specialists who are familiar with sport injuries). However, before undertaking less conventional measures such as Heil's suggestion, perhaps more effective and frequent communication between the athlete and the senior medical care providers is necessary.

The responses athletes gave in the study revealed that their lack of prior experience with the injury encouraged them to seek efficacy (treatment outcome) information from other sources. Specifically, athletes spoke with teammates, friends, family members and medical staff who shared their social reality (common experiences, emotions, and perspectives regarding the rehabilitation process) and provided technical appreciation (reinforcing effort and intensity during physical therapy). When injuries

require abstinence from sport participation for an extended period of time, educating athletes about what to expect during the recovery period may assist in the maintenance of proactive recovery behaviors and positive psychological/emotional responses. Education may include providing comprehensive reading material about medical procedures, peer modeling (videotapes of recovery behavior and process) (Flint, 1991, 1993), and one-on-one consultations with sportsmedicine physicians, athletic trainers, and/or sport psychologists. Setting realistic recovery timetables coupled with alternative training ideas to reduce athletes' boredom, isolation, and loss of conditioning may also be implemented. To assist in creating a more positive outlook, members of the sportsmedicine team can advise injured athletes to focus on what they "can do" and encourage athletes to continually review the progress they have made in their recovery (i.e., gains in strength and flexibility, tuning finer points of the game, etc.).

Over the course of the study (onset of injury to seventh practice), the participants experienced significant fluctuations in their total mood disturbance and specific mood factors (i.e., anger, depression, and tension). Athletes' lack of understanding of what to expect when recovering from injuries may have contributed to these fluctuations. Participants displayed an increased negative total mood state at the first practice after returning to sport that was comparable to their mood disturbance experienced at the onset of injury. Furthermore, they showed significant and highly correlated fluctuations in anger, tension, and depression during recovery and upon return to sport. That is, injured athletes reported significantly greater feelings of antipathy and personal inadequacy, and heightened musculoskeletal tension at both the onset of injury and at the first practice session after receiving medical clearance. Gaining an understanding of the pattern of change and athletes' concerns that may influence fluctuations in mood states may assist sport psychologists, team physicians, trainers, and coaches in

predicting the needs athletes may have during their recovery period and upon return to sport. It is logical that the occurrence of the injury provoked the heightened mood disturbance observed at the onset of injury. The precise reasoning for experiencing changes in total mood disturbance, anger, tension, and depression at the first practice may vary for each individual (i.e., recovery setbacks, lost conditioning, anticipation of return to sport, continued/unexpected pain) and deserves further discussion and investigation.

During interviews, athletes revealed their concerns regarding loss of physical conditioning and skill acquisition, team placement, and reinjury upon returning to practice. Unexpected pain and discomfort accompanied their return to practice. In addition, severe injuries requiring a considerable amount of time away from team practice invoked feelings of isolation and depletion of coping resources (e.g., social support networks). Each of these and other factors may have influenced fluctuations in participants' mood states upon return to practice. To help injured athletes return to sport with less psychological disturbance, efforts can be taken by sport psychologists, sportsmedicine personnel, and coaches prior to medical clearance to return to practice and during reentry to practice.

First, injured athletes should gain a clear understanding of the difficulties they may experience in hopes of exploring specific concerns and developing suitable means of addressing them (Taylor & Taylor, 1997). Communication and education about these issues prior to medical clearance can dispel misconceptions or distorted perceptions. Also, discussions with helping professionals can assist in rehabilitation and return transitions by clarifying the meaning of returning to full health and functioning so as to avoid reinjury, recovery setbacks, and psychological trauma (Taylor & Taylor, 1997).

Secondly, efforts should be undertaken to alleviate athletes' concerns about reinjury. Health care professionals and coaches can assist this process by helping athletes focus on the quality of their rehabilitation, recalling the time and effort athletes have put into the recovery, and recognizing athletes' readiness to return to sport (Taylor & Taylor, 1997). Heil (1993b) also suggests that reinforcing success and developing specific problem-solving strategies that are encountered when returning to play can also guide athletes in developing effective coping strategies.

A team approach consisting of the sportsmedicine team, sport psychologists, coaches, and parents should also be incorporated into the care and decision to return athletes with severe injuries to sport participation (Petrie, 1993). For example, Heil (1993b) recommends coaches look for behaviors (i.e., withdrawal and mental errors) and listen for concerns (i.e., worry regarding reinjury) suggestive of adjustment problems when an athlete is returned to sport participation. Parents, who have special knowledge about their child, can provide useful information regarding subtle changes in behavior and influence rehabilitation compliance behavior of their child, the athlete (Heil, 1993b).

Over the years, research addressing the comprehensive role of athletic trainers (Danish, 1982; Flint, 1991; Gaunyer & Hoerner, 1982; Larson, Starkey, & Zaichowsky, 1996; Wiese, Weiss, & Yukelson, 1991), sportsmedicine physicians (Johnson, 1991; Pedersen, 1986; Wiese & Weiss, 1987), coaches (Heil, 1993b; Petrie, 1993; Taylor & Taylor, 1997), and sport psychologists (Lynch, 1988; Petitpas & Danish, 1995; Rotella, 1985; Yukelson, 1986) in the psychological/emotional care and physical recovery of athletes who suffer severe injuries has grown with the sport psychology literature. While additional awareness and training for these professionals can benefit injured athletes, athletes whose injuries require an extended recovery period may exceed the resources of physicians, trainers, and coaches. A team approach including the services of sport

psychologists, with individuals and groups of injured athletes, may provide the necessary attention athletes need to generate and maintain positive mood states and confidence during recovery and upon return to sport participation without overburdening a single support agent.

Research studies examining social ties and the type of support given to injured athletes describe the role of parents as one of providing emotional and motivational support, understanding, and listening (Taylor & Taylor, 1997; Udry et al., 1997). These findings were supported by the participant's declaration that they called their parents as soon as possible after receiving their injuries. However, parents can play a more active and defined role in the team approach for treating injured athletes. Gould and his colleagues (1997a) found that several athletes reported that their family and friends provided assistance in instrumental ways such as providing transportation, taking care of household chores, and assisting in physical therapy sessions. Understanding that college athletes are individuals in transition from adolescence to adulthood supports the importance of involving parents in the recovery team. Schlossberg (1984) viewed early adulthood and the midlife period as a time of transition where the individual undergoes an event or a series of events that result in change in relationships, routines, assumptions, and roles within the setting of self, work, family, health, and/or economics. While in transition, young adults may seek the advice and knowledge of a trusted authority when in distress. The willingness of collegiate athletes to seek parental advice and support immediately after the onset of injury and throughout recovery indicated that young adults continue to depend on their parents when making decisions regarding their health. Thus, the need to formally incorporate parents in the care of injured athletes as a resource for emotional and motivational support, interpreting/deciding medical issues, and encouragement for adherence to the rehabilitation program is evident. However,

while the importance of parental involvement is evident in the care of injured athletes, understanding the full extent of their provisions has not been addressed in the sportsmedicine and sport psychology literature. Future research should include in-depth investigation of the types of support parents provide injured athletes and how those provisions can be incorporated into the team approach for the psychological and physical care of injured athletes.

Limitations

Limiting the study to the assessment of athletes who sustain a severe injury requiring at least 7 days away from practice led to a small sample of participants who met the criteria for inclusion in the study within the data collection time allowance and may affect the ability to generalize these results. However, calculating the effect size (power) of the quantitative statistics allowed us to assume that the reason for not obtaining a significant p value and rejecting the null hypothesis may be that the t test did not have enough power for the size of sample used in the study. In which case, gaining a greater number of participants in the study may have yielded different or more significant results. However, to increase understanding of the quantitative data, ethnographic interviews were conducted. During the design of this study, it was predicted that achieving a small sample was highly probable. The interview piece provided an abundance of information regarding individual differences and similarities during the rehabilitation of severe injuries, and despite their differences, patterns of athletes' response to injury were determined. The in-depth interviews also served to control for Hawthorne effects. That is, questions designed to follow-up on participants' questionnaire responses, repeated contact with the principal investigator (establishing a rapport), and assurance of confidentiality and anonymity of responses encouraged participants to respond honestly.

Second, to reduce the chances of fraud in selecting participants for the study, diagnosis made by sportsmedicine physicians and athletic trainers determined if an athlete had sustained an injury that met the study's criterion for inclusion. This required permission from the senior sportsmedicine physicians and senior athletic trainer during the design phase of the study, and close, continual contact with the athletic training staff during data collection to assure notification of potential participants. While this may not qualify as a limitation to research in and of itself, it is important to consider the criticality of establishing a relationship with the training staff when designing a study such as this. The athletic training staff who assisted in this study were enthusiastic and genuinely interested in this study and were diligent in their efforts to inform of possible participants. However, it should be kept in mind that this reception, although not unusual, may not be granted to all researchers.

Future Directions

As discussed earlier, when studying the impact of severe injuries on the psychological welfare of athletes while they are undergoing rehabilitation, temporal constraints may create difficulty in gaining a sample size large enough to generalize results. Furthermore, the use of repeated measures and ethnographic methods, has been encouraged within the sport psychology literature (i.e., Wiese-Bjornstal et al., 1998). To invoke honesty in participants' responses and convey a sense of empathy injured athletes may need during this disruptive period, it may be imperative that the researcher(s) remain within close proximity to the participants during the data collection period. This may limit researchers' ability to achieve a cross-section population needed for the generalization of results. Therefore, future research in the area of athletes and sports injuries utilizing methods such as those used in this study may need to rely on

ideographic studies to generate further understanding of the psychological ramifications of sport injuries.

Within Wiese-Bjomstal et al.'s (1998) integrated model are listed a number of personal and situational factors that may interact to affect an athlete's response to the sport injury. Developing a research study that investigates all the variables that may affect an athlete during recovery seems almost impossible to design. However, this does not mean that investigating the influence of personal and situational factors on athletes' response to injury and rehabilitation should not be continued. Like this study, which assessed three of the variables noted within the model, future research should continue to include investigations that consider factors such as type of injury (i.e., chronic, chronic-surgical, acute, acute-surgical), timeliness of injury onset (i.e., early vs. late in season), status on team, and time away from practice (i.e., one week, three weeks, etc.). Studies such as these could help theorists and practitioners to determine and predict factors that may impact athletes' recovery behaviors.

This study was intended to provide athletes an opportunity to voice their concerns regarding the rehabilitation of their injuries. It is from their perspective. However, as discussed earlier, a team approach consisting of parents, doctors, trainers, coaches, and sport psychologists has been suggested as a means for providing the various types of support athletes need throughout their recovery. Therefore, research designed to assess the perspective of potential supporters and care team members regarding athletes and sport-related injury recovery is warranted.

Finally, the knowledge gained through formal research techniques must be integrated and applied. This involves providing educational/instructional material for athletes that will better inform them of what to expect, their responsibilities, and resources available during their recovery. This may include reading material (i.e.,

pamphlets, journal articles), videotapes of surgical procedures and modeling behavior during rehab, and consultation with sport psychologists and psychotherapists.

As for the development of the team approach for the care of injured athletes, coaches education programs could incorporate information regarding the injured athlete's unique situation and how coaches can provide support. Overburdened sportsmedicine physicians and athletic trainers could refer athletes who require longer-term care and/or greater emotional support to sport psychologists where individual and group support sessions may be implemented. Finally, the role of parents needs to be defined and integrated as well.

APPENDIX A

University Committee on Research Involving Human

Subjects (UCRIHS): Notice of Approval

MICHIGAN STATE UNIVERSITY

September 17, 1997

TO: Martha E. Ewing
201 IM Sports Circle

RE: IRB#: 97-608
TITLE: LEVELS OF SELF-CONFIDENCE DURING REHABILITATION
OF SEVERE ATHLETIC INJURIES
REVISION REQUESTED: N/A
CATEGORY: 1-A,B,C,D
APPROVAL DATE: 09/10/97

The University Committee on Research Involving Human Subjects' (UCRIHS) review of this project is complete. I am pleased to advise that the rights and welfare of the human subjects appear to be adequately protected and methods to obtain informed consent are appropriate. Therefore, the UCRIHS approved this project and any revisions listed above.

RENEWAL: UCRIHS approval is valid for one calendar year, beginning with the approval date shown above. Investigators planning to continue a project beyond one year must use the green renewal form (enclosed with the original approval letter or when a project is renewed) to seek updated certification. There is a maximum of four such expedited renewals possible. Investigators wishing to continue a project beyond that time need to submit it again for complete review.

REVISIONS: UCRIHS must review any changes in procedures involving human subjects, prior to initiation of the change. If this is done at the time of renewal, please use the green renewal form. To revise an approved protocol at any other time during the year, send your written request to the UCRIHS Chair, requesting revised approval and referencing the project's IRB # and title. Include in your request a description of the change and any revised instruments, consent forms or advertisements that are applicable.



OFFICE OF
RESEARCH
AND
GRADUATE
STUDIES

**PROBLEMS/
CHANGES:**

Should either of the following arise during the course of the work, investigators must notify UCRIHS promptly: (1) problems (unexpected side effects, complaints, etc.) involving human subjects or (2) changes in the research environment or new information indicating greater risk to the human subjects than existed when the protocol was previously reviewed and approved.

If we can be of any future help, please do not hesitate to contact us at (517)355-2180 or FAX (517)432-1171.

Sincerely,

David E. Wright
David E. Wright, Ph.D.
UCRIHS Chair
DEW:bed

University Committee on
Research Involving
Human Subjects
(UCRIHS)
Michigan State University
246 Administration Building
East Lansing, Michigan
48824-1046
517/355-2180
FAX: 517/432-1171

cc: dawn Lewis

The Michigan State University
IDEA is Institutional Diversity
Excellence in Action

MSU is an affirmative-action,
equal-opportunity institution

APPENDIX B

Demographic Survey

First Initial ____ Middle Initial ____ Last 4 Digits of Social Security Number ____

Demographic Information

Age ____

Ethnicity

Sex

____ Female

____ Male

____ African-American

____ Asian-American

____ Caucasian

____ Hispanic-American

____ Multi-ethnic

____ Native American

____ Pacific Islander

____ Other (specify) ____

Year in School

____ Freshman

____ Sophomore

____ Junior

____ Senior

____ 5th Year Senior

____ Graduate

Varsity Sport (Currently competing in)

____ Baseball

____ Basketball

____ Crew

____ Cross Country

____ Diving

____ Field Hockey

____ Football

____ Golf

____ Gymnastics

____ Hockey

____ Soccer

____ Softball

____ Swimming

____ Tennis

____ Track & Field

____ Wrestling

____ Volleyball

Team Position or Rank (if any) _____

Event of Specialization (if any) _____

Do you receive an athletic scholarship (either full or partial) to attend this university? Yes

No

Complete the following table for the injury you have just sustained. Use the example below as a guide.

Type of Injury (sprain, fracture, etc.)	Location of Injury	1st time ever injured?	1st time with this injury?	Is surgery required?	Supportive bracing, cast, tape, etc.? (specify)	Projected number of practices missed
EXAMPLE dislocation	right shoulder	Yes No (circle one)	Yes No (circle one)	Yes No (circle one)	sling	3 - 5 weeks
		Yes No (circle one)	Yes No (circle one)	Yes No (circle one)		

Briefly describe the situation leading to the injury.

APPENDIX C

Profile of Mood States Short Form (POMS Short Form)

First Initial ____ Middle Initial ____ Last 4 Digits of Social Security Number ____

Below is a list of words that describe feelings people have. Please read each one carefully. Then fill in ONE circle under the answer to the right which best describes HOW YOU FEEL RIGHT NOW. If you are unsure what a word means (i.e., 18. muddled), look for number 18 on the back side of the questionnaire for an alternative definition.

The numbers
refer to these phrases.

- 0 = Not at all
 1 = A little
 2 = Moderately
 3 = Quite a bit
 4 = Extremely

	Not at all A little Moderately Quite a bit Extremely		Not at all A little Moderately Quite a bit Extremely		Not at all A little Moderately Quite a bit Extremely
1. Tense	0 1 2 3 4	12. Uneasy	0 1 2 3 4	23. Weary	0 1 2 3 4
2. Angry	0 1 2 3 4	13. Fatigued	0 1 2 3 4	24. Bewildered	0 1 2 3 4
3. Worn out	0 1 2 3 4	14. Annoyed	0 1 2 3 4	25. Furious	0 1 2 3 4
4. Lively	0 1 2 3 4	15. Discouraged	0 1 2 3 4	26. Efficient	0 1 2 3 4
5. Confused	0 1 2 3 4	16. Nervous	0 1 2 3 4	27. Full of pep	0 1 2 3 4
6. Shaky	0 1 2 3 4	17. Lonely	0 1 2 3 4	28. Bad-tempered	0 1 2 3 4
7. Sad	0 1 2 3 4	18. Muddled	0 1 2 3 4	29. Forgetful	0 1 2 3 4
8. Active	0 1 2 3 4	19. Exhausted	0 1 2 3 4	30. Vigorous	0 1 2 3 4
9. Grouchy	0 1 2 3 4	20. Anxious	0 1 2 3 4		
10. Energetic	0 1 2 3 4	21. Gloomy	0 1 2 3 4		
11. Unworthy	0 1 2 3 4	22. Sluggish	0 1 2 3 4		

**MAKE SURE
YOU HAVE ANSWERED
EVERY ITEM.**



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SHORT FORM

A

C

D

F

T

V

APPENDIX D

Alternative Words List for the POMS Short Form

Alternative Words and Phrases

1. **Tense** - under a strain, stressed
2. **Angry** - mad, aggravated
3. **Worn out** - tired, burned out
4. **Lively** - spirited, full of energy
5. **Confused** - not knowing what to do, baffled
6. **Shaky** - lacking confidence, unsteady
7. **Sad** - heart broken, sorrowful
8. **Active** - on the go, keeping busy
9. **Grouchy** - crabby, grumpy
10. **Energetic** - enthusiastic, peppy
11. **Unworthy** - not deserving, of little value
12. **Uneasy** - uncomfortable, ill at ease
13. **Fatigued** - petered out, run down
14. **Annoyed** - bothered, bugged
15. **Discouraged** - wanting to give up, dampened spirit
16. **Nervous** - worried, uptight
17. **Lonely** - isolated, feeling left out
18. **Muddled** - mixed up, disoriented
19. **Exhausted** - completely spent, unable to continue
20. **Anxious** - concerned, fearful
21. **Gloomy** - depressed, cheerless
22. **Sluggish** - dragging, slow acting
23. **Weary** - drained, beat
24. **Bewildered** - puzzled, dumbstruck
25. **Furious** - enraged, fuming
26. **Efficient** - competent, productive
27. **Full of pep** - ready to go, full of gusto
28. **Bad tempered** - hotheaded, foul disposition
29. **Forgetful** - unable to remember, absentminded
30. **Vigorous** - powerful, potent

APPENDIX E

Injury Confidence Questionnaire

First Initial ____ Middle Initial ____ Last 4 Digits of Social Security Number ____

Directions: Read each statement and then circle the appropriate number to the right of the statement to indicate *HOW CONFIDENT YOU FEEL RIGHT NOW* - at this moment. There are no right or wrong answers. Do *not* spend too much time on any one statement, but choose the answer which describes your feelings *right now*.

- | | Not at all | | Somewhat | | Highly | | | | | | |
|--|------------|----|----------|----|--------|----|----|----|----|-----|----|
| 1. How confident are you in the diagnosis of your injury? | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 2. How confident are you in the assessment of the severity of your injury? | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 3. How confident are you that the proposed treatment will properly rehabilitate the injury? | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 4. How confident are you that the anticipated recovery time is enough to rehabilitate the injury? | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 5. How confident are you that the athletic training staff can provide the care necessary to properly rehabilitate your injury? | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 6. How confident are you that the available facilities (training room, weight room, etc.) are properly equipped to assist in your recovery? | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 7. How confident are you that pre-treatment (taping, heating, special stretches) will aid in your ability to complete the practice session? | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 8. How confident are you that post-treatment (icing, bandaging, special stretches, medication) will prepare you for the next practice session? | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 9. Right now I feel my injury is ____% healed. (circle one) | | | | | | | | | | | |
| | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 | |

(OVER)

Directions: Complete the rating scale by circling the number which most accurately corresponds to *YOUR BELIEFS RIGHT NOW* - at this moment in your recovery.

	Not at all	Somewhat	Highly
10. I am confident I can perform the warm up exercises for the practice session just as well as prior to my injury.	0	1	2 3 4 5 6 7 8 9 10
11. I am confident I can perform the warm up stretches just as well as prior to my injury.	0	1	2 3 4 5 6 7 8 9 10
12. I am confident I can perform the strength and conditioning exercises (weight training, plyometrics) just as well as prior to my injury.	0	1	2 3 4 5 6 7 8 9 10
13. I am confident I can perform the specific practice activities I am allowed to participate in (drills, repetitions) just as well as prior to my injury.	0	1	2 3 4 5 6 7 8 9 10
14. I am confident I can perform the typical practice session (scrimmage, interval training, running offensive/defensive plays) just as well as prior to my injury.	0	1	2 3 4 5 6 7 8 9 10
15. I am confident I can perform the cool down exercises of the practice session just as well as prior to my injury.	0	1	2 3 4 5 6 7 8 9 10
16. I am confident I can perform the cool down stretches just as well as prior to my injury.	0	1	2 3 4 5 6 7 8 9 10
17. I am confident I can perform in competition just as well as prior to my injury.	0	1	2 3 4 5 6 7 8 9 10

APPENDIX F
Interview Questions

Interview Guide

When injury occurs:

1. How long have you participated in this sport?
 - a. Have you been injured before?
 - b. If yes, what was the injury?
How long ago?
How severe was the injury? (How much time did you miss practice or games?)
2. Describe the injury you just received?
 - a. What were you doing when the injured occurred?
 - b. Were you having a good practice when the injury occurred?
 - c. What went through your mind at the time you were injured?
3. What have you been told about your injury?
 - a. Who told you – Doctor, Athletic Trainer?
 - b. How long did the doctor tell you that you will be out of practice?
 - c. How long do you think you will be out of practice?
 - d. If different responses: Why do you think it will be more or less time?
4. How do you cope with an injury?
 - a. Loss of playing and practice time?
 - b. Not being part of the team?

During Rehabilitation

1. Tell me about the rehab program you are on?
 - a. How often?
 - b. Where exercise?
 - c. Who assists you in exercises?
 - d. How would you describe the effectiveness of the rehab program?
 - e. Do you do exercises at home or on your own to speed the recovery?
2. How would you describe the care/treatment you are receiving?
 - a. Social support?
 - b. Response of teammates and coaches?
 - c. Medical staff?
3. What do you expect from your physician? The athletic training staff?
 - a. Are these expectations being met?
4. Rehabilitation of injuries can be tiresome and painful. What keeps you going?
 - a. Who do you talk to the most about your injury?
 - b. How has this person helped you deal with your injury?
 - c. What kinds of things do you talk about?
5. How do you feel about the progress you have made during your rehab?
 - a. What more can you do to make this recovery a successful one?
 - b. What more can others do to help you through the recovery of your injury?
6. When do you think you will be able to return to practice?
 - a. What are you most concerned about when thinking about returning to practice?
 - b. Tell me about your concerns regarding this injury, recovery, and returning to practice.
7. What is one positive thing about being injured? One negative?

Returning to Practice

1. During recovery, what were your personal expectations for returning to practice? Have you met your expectations? How so? How not?
2. Tell me about how it felt to be back at practice? What were your concerns? What were you thinking during practice? How do you feel after practice?
3. What has been the response of coaches and your teammates to your return to practice?
 - a. Did you expect this reception? Why or why not?
4. What was the hardest part of returning to practice: physical or mental? Explain.
5. What more could be done to help you in your return to practice?
 - a. Medical staff?
 - b. Athletic trainers?
 - c. Psychologically?
6. What is one thing you have learned during your injury and rehab that you would share with other injured athletes that could help them?

APPENDIX G

Consent Form

Consent Form

This study is designed to assess the thoughts and feelings of intercollegiate athletes who have sustained an injury. Research findings will provide athletes, athletic trainers, coaches, and sport psychologists a better understanding of how these thoughts and feelings influence athletes' performance when returned to practice and competition.

You will be asked to complete surveys and participate in interviews on 6 occasions during the study. Testing will occur throughout injury rehabilitation and upon return to team practice and competition. Questionnaires will take approximately 3 to 5 minutes to complete. Interviews will be brief and will take approximately 10 to 15 minutes per session.

Participation in this study is voluntary. You may choose not to participate at all, may refuse to answer certain questions, or may discontinue in the study at any time without penalty or loss of benefits to which the you are otherwise entitled.

All results of this study will be treated with strictest confidence and you will remain anonymous in any report of research findings. Your completed surveys will not be shared with coaches or athletic trainers. You will not be identified by name, position, or the sport in which you participate. Only group data will be presented in write ups and discussions of this study. You will be assigned a code to be used on surveys and interview transcripts to protect your identity. Voice recorded interviews, transcripts, and surveys will be stored in a secure, locked area. Only the principal investigator will have access to this area. At the conclusion of reporting study findings, master lists of identification codes will be destroyed. On request and within these restrictions, results may be made available to you.

Questions or concerns regarding participation in this study should be directed to Dawn Lewis, 353-0892, or Dr. Marty Ewing, 353-4652.

.....

I have read the above description of this research project. I understand my rights as a participant and agree to participate in this study.

Please Print First Name Middle Initial Last Name

Participant's Signature

Date

Project Investigator's Signature

Date

APPENDIX H

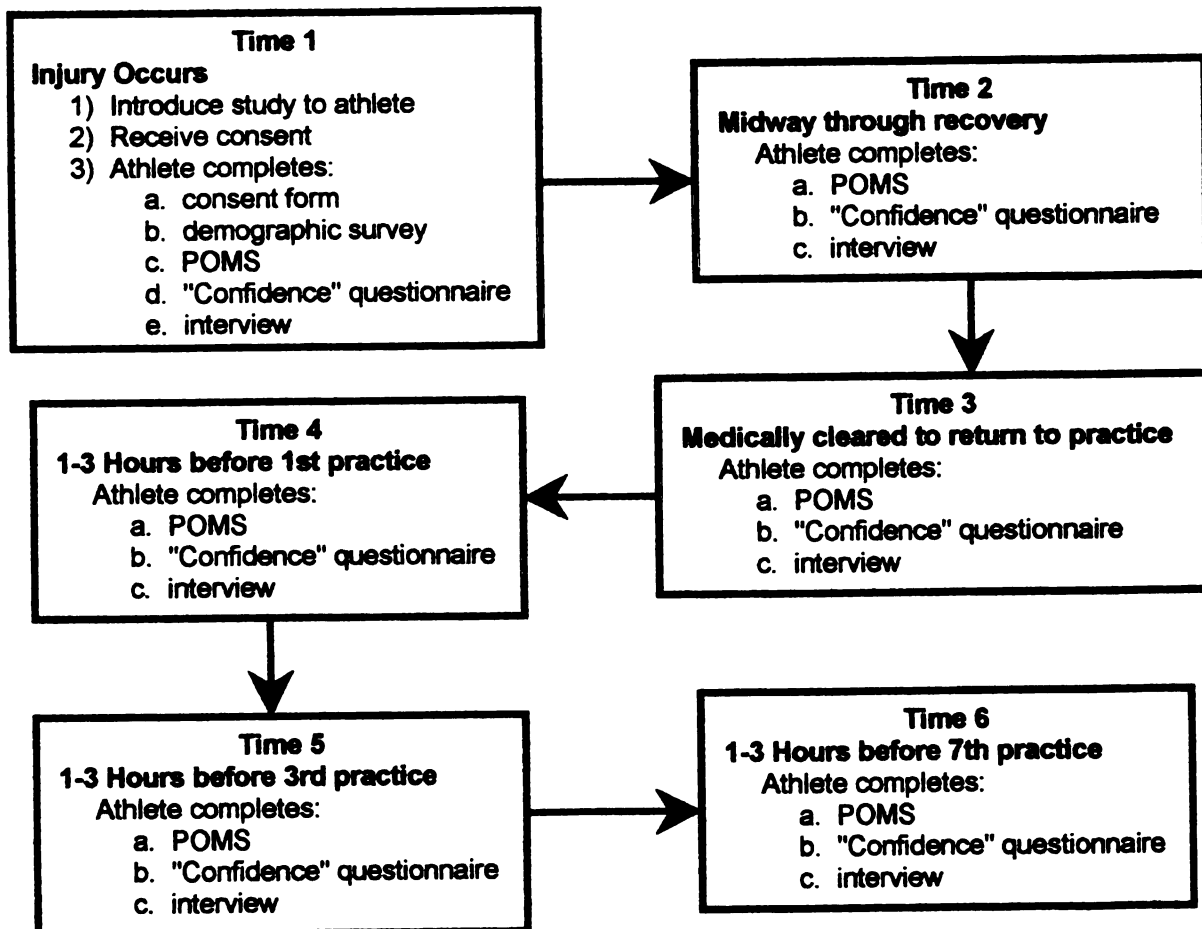
Data Collection Instructions for Athletic Trainers and Participants

Data Collection Instructions for Athletic Trainers and Participants

- I. **Participants must be:**
 1. student-athletes participating in a varsity sport
 2. diagnosed by the team physician or athletic trainer with an injury requiring the athlete to remain from practice and/or competition for at least 7 days
 3. an athlete whose sport has at least 2 weeks remaining in the season
 4. an athlete whose injury is not season-ending
- II. Athletes will complete surveys in the athletic training room in which they receive treatment. Interviews will also take place in the athletic training room (in a private area).
- III. **Data Collection**
 1. Athletic trainers will be given survey packets (large yellow envelopes) for participants, which contain 6 questionnaire sets consisting of:
 - a. 1 consent form
 - b. 1 demographic survey
 - c. 6 "Feeling" questionnaires
 - d. 6 "Confidence" questionnaires
 2. On the packet's label (see back), the athletic trainer will fill in
 - a. the athlete's name
 - b. the date the injury occurred, and
 - c. the estimated projected date the athlete will return to practice
 3. The 6 items below the dotted line are for the athlete to fill in as they complete each set of surveys for that point in his/her recovery.
 4. Athletes should be instructed (and reminded) to complete questionnaires in accordance with the data collection timeline (see back).
 5. Athletes will place consent form, demographic survey, and completed questionnaires in the #10 envelope attached to the survey set, seal the envelope, and sign and date the envelope flap.
 6. Athletes will place sealed envelopes in the box marked "Dropbox for Dawn Lewis" which will be easily located in each of the training rooms.
 7. Athletic trainers should contact Dawn Lewis to inform her of new participants and to make her familiar with participants' treatment schedules so she may conduct interviews. Dawn will also remain in close contact with the athletic trainers and make frequent visits to the training rooms to pick up data and conduct interviews.
 8. Concerns and questions should be directed to:
Dawn Lewis, (telephone number and e-mail address) or
Martha E. Ewing, (telephone number and e-mail address)

Large Yellow Envelope Label:

Athlete's Name: _____		Completed by Athletic Trainer
Date Injured: ____/____/____		
Projected Date of Return to Practice: ____/____/____		
1. Onset of Injury:	____/____/____ (Date)	Completed by Athlete
2. Midpoint of Projected Date to Return:	____/____/____ (Date)	
3. Cleared to Return to Practice:	____/____/____ (Date)	
4. 1st Practice:	____/____/____ (Date)	
5. 3rd Practice:	____/____/____ (Date)	
6. 7th Practice:	____/____/____ (Date)	

Data Collection Timeline:

APPENDIX I

Confidence Inventory Statistical Analysis Tables

Table I1

Injured Athletes' Treatment Confidence Mean Scores at Each Assessment Point

Participant	Onset	Recovery Midpoint	Medical Clearance	1st Practice	3rd Practice	7th Practice
P ₁	6.50	7.38	6.38	8.50	9.38	9.50
P ₂	7.75	9.00	9.75	10.00	10.00	10.00
P ₃	8.63	8.75	8.00	7.50	8.38	8.50
P ₄	8.00	9.63	9.88	10.00	10.00	10.00
P ₅	10.00	10.00	10.00	10.00	10.00	10.00

Table I2

Injured Athletes' Self-confidence Mean Scores at Each Assessment Point

Participant	Onset	Recovery Midpoint	Medical Clearance	1st Practice	3rd Practice	7th Practice
P ₁	7.38	6.50	9.38	9.88	9.75	10.00
P ₂	4.25	7.25	7.88	9.88	10.00	10.00
P ₃	6.00	6.00	6.00	8.25	8.75	9.13
P ₄	0.50	5.38	8.75	9.00	9.38	9.38
P ₅	4.63	7.00	8.50	8.50	9.00	9.13

APPENDIX J

Profile of Mood States Subscales Tables and Figures

Table J1

Confusion Subscale of the POMS: Means and Standard Deviations

	Mean (N=5)	Std. Deviation	Std. Error Mean
Onset	6.00	4.06	1.82
Recovery Midpoint	6.40	3.91	1.75
Med. Clearance	6.00	4.69	2.10
1st Practice	6.00	4.69	2.10
3rd Practice	5.60	4.72	2.11
7th Practice	5.20	3.83	1.71

Table J2

Confusion Subscale of the POMS: Summary of Paired Sample T-Test of Means

	t	df	Sig. (2-tailed)	Effect Size (η^2)
Onset to Recovery Midpoint	-1.00	4	.37	.00
Recovery Midpoint to Med. Clearance	.78	4	.48	.04
Med. Clearance to 1st Practice	.00	4	1.00	.00
1st Practice to 3rd Practice	.36	4	.74	.08
Onset to 3rd Practice	.39	4	.72	.08
3rd Practice to 7th Practice	.36	4	.74	.08
Onset to 7th Practice	1.37	4	.24	.08

Table J3

Vigor Subscale of the POMS: Means and Standard Deviations

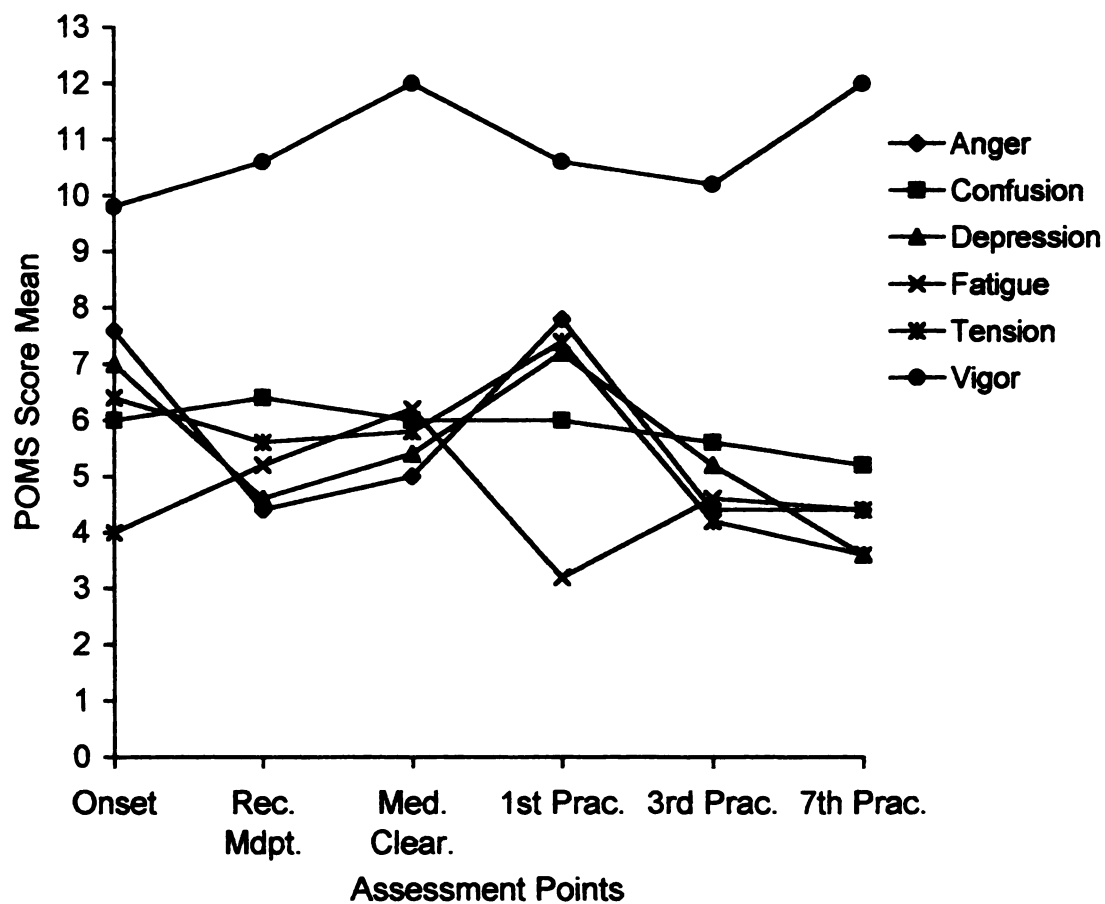
	Mean (N=5)	Std. Deviation	Std. Error Mean
Onset	9.80	2.77	1.24
Recovery Midpoint	10.60	3.58	1.60
Med. Clearance	12.00	1.00	.45
1st Practice	10.60	3.44	1.54
3rd Practice	10.20	5.26	2.35
7th Practice	12.00	2.45	1.10

Table J4

Vigor Subscale of the POMS: Summary of Paired Sample T-Test of Means

Assessment Point Means Compared	t	df	Sig. (2-tailed)	Effect Size ($\hat{\omega}^2$)
Onset to Recovery Midpoint	-.59	4	.59	.06
Recovery Midpoint to Med. Clearance	-.83	4	.45	.03
Med. Clearance to 1st Practice	1.03	4	.36	.01
1st Practice to 3rd Practice	.30	4	.78	.08
Onset to 3rd Practice	-.15	4	.89	.09
3rd Practice to 7th Practice	-1.23	4	.29	.05
Onset to 7th Practice	-1.08	4	.34	.02

Figure J1. Graph of injured athletes' POMS subscale raw score means at each assessment point.



APPENDIX K

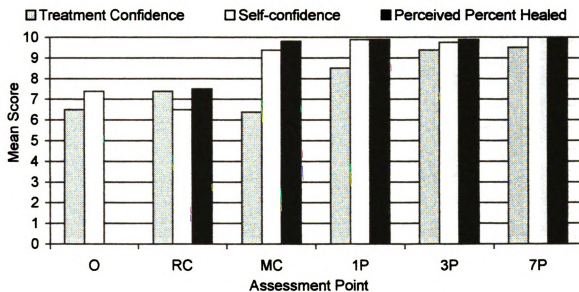
**Examination of Individual Injured Athlete's Treatment Confidence,
Self-confidence, and Perceived Percent Healed**

Table K1

Participant₁: Treatment Confidence & Self-confidence Means Scores, and Perceived Percent Healed at each Assessment Point

	Onset	Rec. Midpt.	Med. Clear.	1st Prac.	3rd Prac.	7th Prac.
Treatment Confidence	6.50	7.38	6.38	8.50	9.38	9.50
Self-confidence	7.38	6.50	9.38	9.88	9.75	10.00
Perceived Percent Healed	0.0	75	98	99	99	100

Figure K1. Participant₁: Bar graph of treatment confidence & self-confidence means scores, and *perceived percent healed at each assessment point.



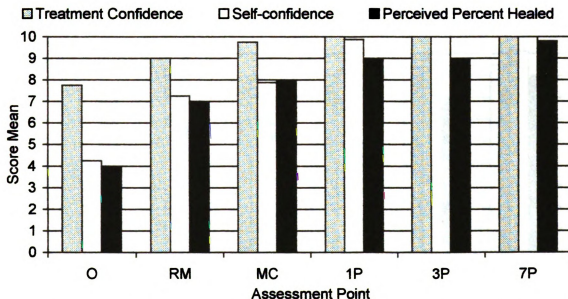
*To remain constant with the treatment and self-confidence inventories unit of measure, perceived percent healed scores were change from hundredths to tenth.

Table K2

Participant₂: Treatment Confidence & Self-confidence Means Scores, and Perceived Percent Healed at Each Assessment Point

	Onset	Rec. Midpt.	Med. Clear.	1st Prac.	3rd Prac.	7th Prac.
Treatment Confidence	7.75	9.00	9.75	10.00	10.00	10.00
Self-confidence	4.25	7.25	7.88	9.88	10.00	10.00
Perceived Percent Healed	40	70	80	90	90	98

Figure K2. Participant₂: Bar graph of treatment confidence & self-confidence means scores, and *perceived percent healed at each assessment point.



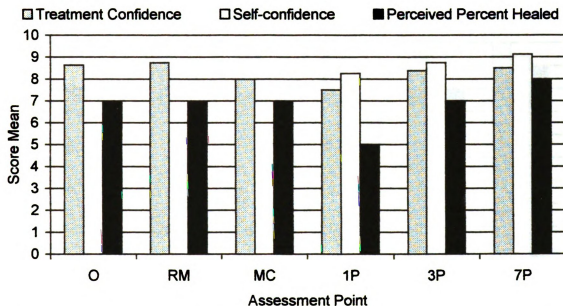
*To remain constant with the treatment and self-confidence inventories unit of measure, perceived percent healed scores were change from hundredths to tenth.

Table K3

Participant₃: Treatment Confidence & Self-confidence Means Scores, and Perceived Percent Healed at Each Assessment Point

	Onset	Rec. Midpt.	Med. Clear.	1st Prac.	3rd Prac.	7th Prac.
Treatment Confidence	8.63	8.75	8.00	7.50	8.38	8.50
Self-confidence	6.00	6.00	6.00	8.25	8.75	9.13
Perceived Percent Healed	70	70	70	50	70	80

Figure K3. Participant₃: Bar graph of treatment confidence & self-confidence means scores, and *perceived percent healed at each assessment point.



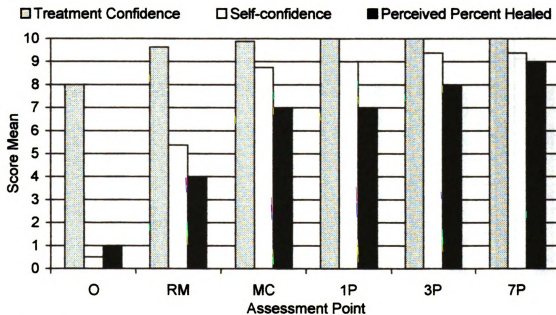
*To remain constant with the treatment and self-confidence inventories unit of measure, perceived percent healed scores were change from hundredths to tenth.

Table K4

Participant₄: Treatment Confidence & Self-confidence Means Scores, and Perceived Percent Healed at Each Assessment Point

	Onset	Rec. Midpt.	Med. Clear.	1st Prac.	3rd Prac.	7th Prac.
Treatment Confidence	8.00	9.63	9.88	10.00	10.00	10.00
Self-confidence	0.50	5.38	8.75	9.00	9.38	9.38
Perceived Percent Healed	10	40	70	70	80	90

Figure K4. Participant₄: Bar graph of treatment confidence & self-confidence means scores, and *perceived percent healed at each assessment point.



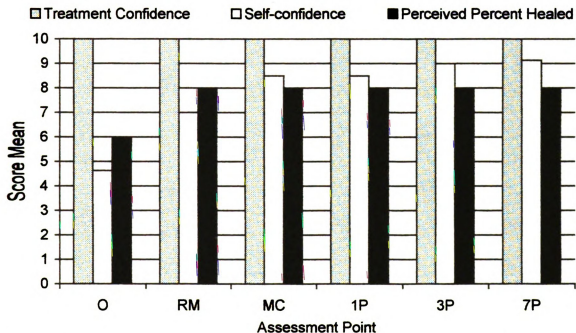
*To remain constant with the treatment and self-confidence inventories unit of measure, perceived percent healed scores were change from hundredths to tenth.

Table K5

Participants: Treatment Confidence & Self-confidence Means Scores, and Perceived Percent Healed at Each Assessment Point

	Onset	Rec. Midpt.	Med. Clear.	1st Prac.	3rd Prac.	7th Prac.
Treatment Confidence	10.00	10.00	10.00	10.00	10.00	10.00
Self-confidence	4.63	7.00	8.50	8.50	9.00	9.13
Perceived Percent Healed	60	80	80	80	80	80

Figure K5. Participants: Bar graph of treatment confidence & self-confidence means scores, and *perceived percent healed at each assessment point



*To remain constant with the treatment and self-confidence inventories unit of measure, perceived percent healed scores were change from hundredths to tenth.

APPENDIX L

**The Iceberg Profile: Comparison of Raw Score Means of Injured
Athletes' POMS Subscale Scores for each Assessment Point
with Morgan and Pollock's (1977) College Middle Distance Runners**

Legend

T - Tension

D - Depression

A - Anger

V - Vigor

F - Fatigue

C - Confusion

Figure L1. Graph of raw score means for injured athletes at *injury onset* with college middle distance runners on each POMS subscale

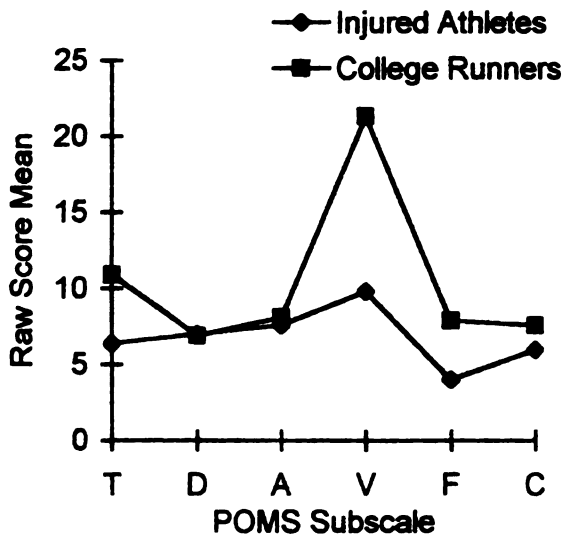


Figure L2. Graph of raw score means for injured athletes at *injury recovery midpoint* with college middle distance runners on each POMS subscale.

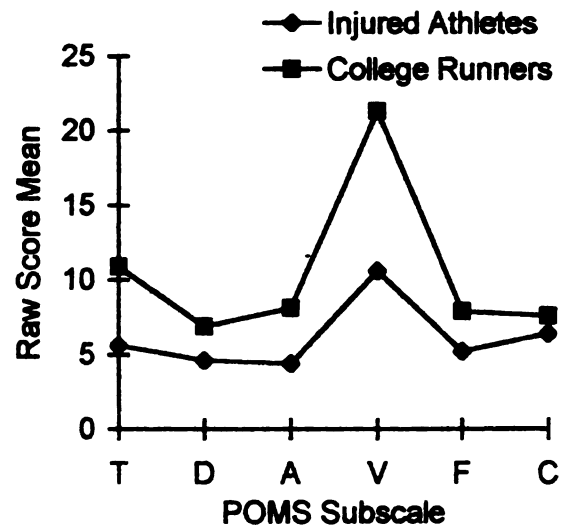


Figure L3. Graph of raw score means for injured athletes at *medical clearance* with college middle distance runners on each POMS subscale

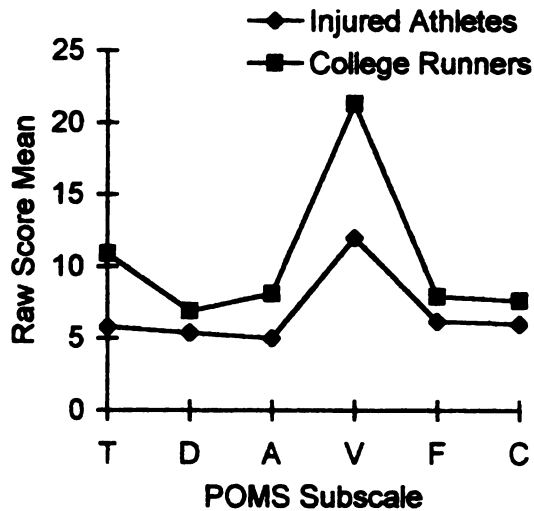


Figure L4. Graph of raw score means for injured athletes at *1st practice* with college middle distance runners on each POMS subscale.

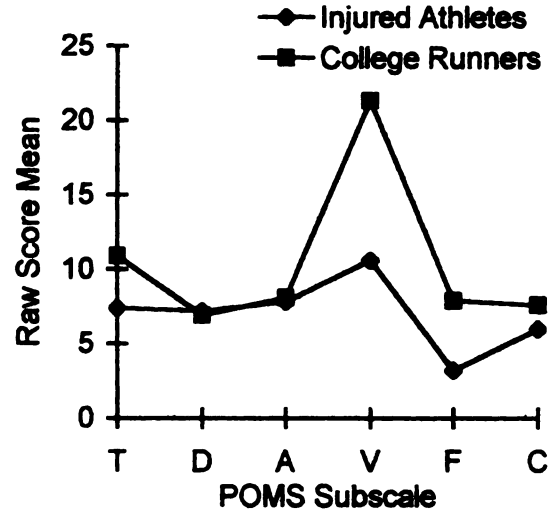


Figure L5. Graph of raw score means for injured athletes at *3rd practice* with college middle distance runners on each POMS subscale.

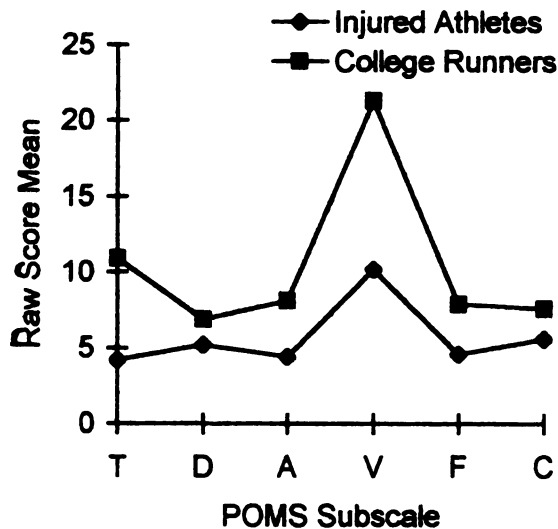
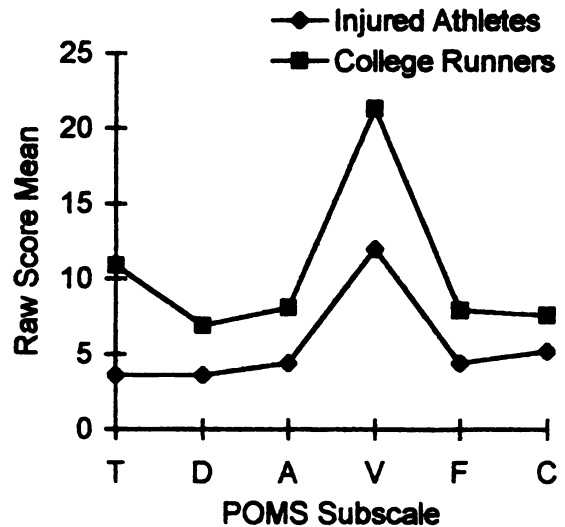


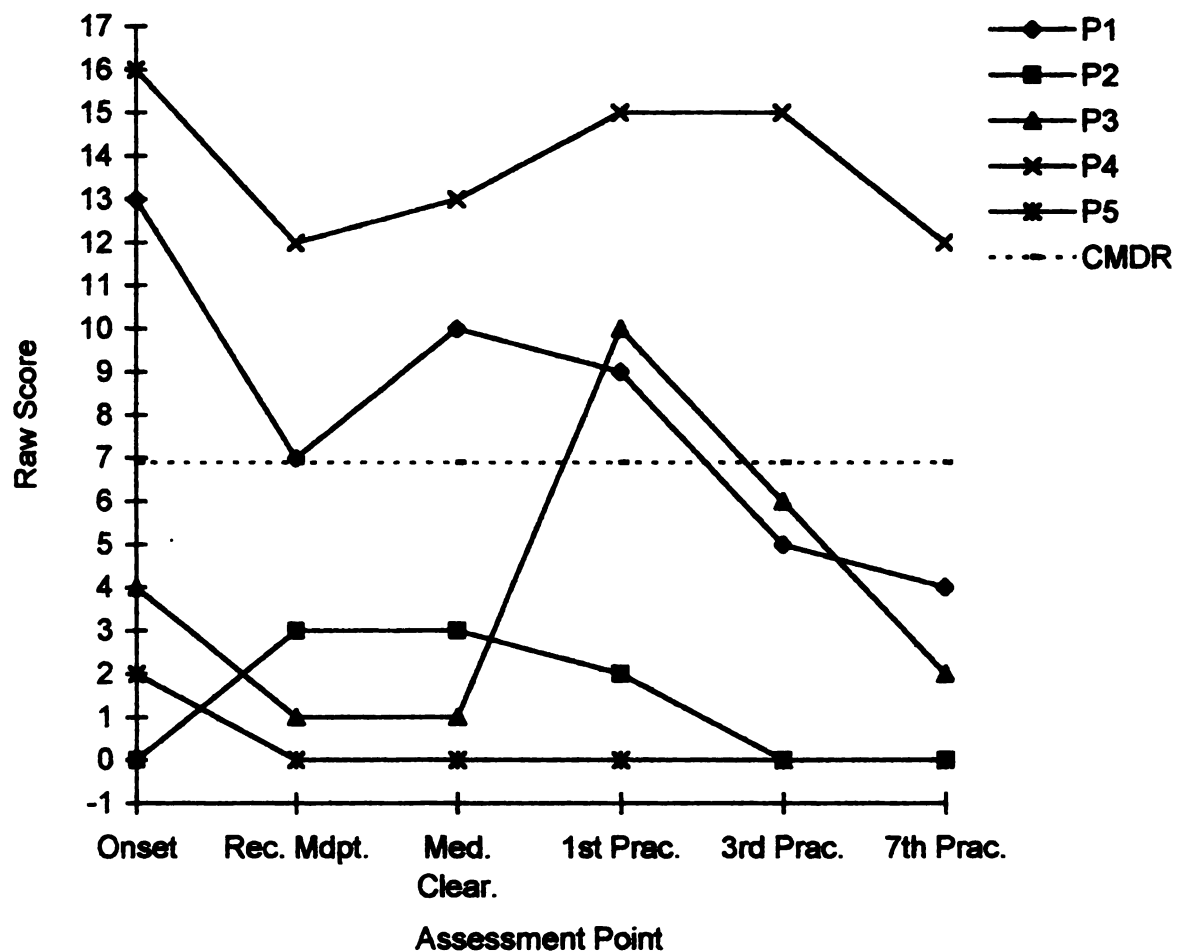
Figure L6. Graph of raw score means for injured athletes at *7th practice* with college middle distance runners on each POMS subscale.

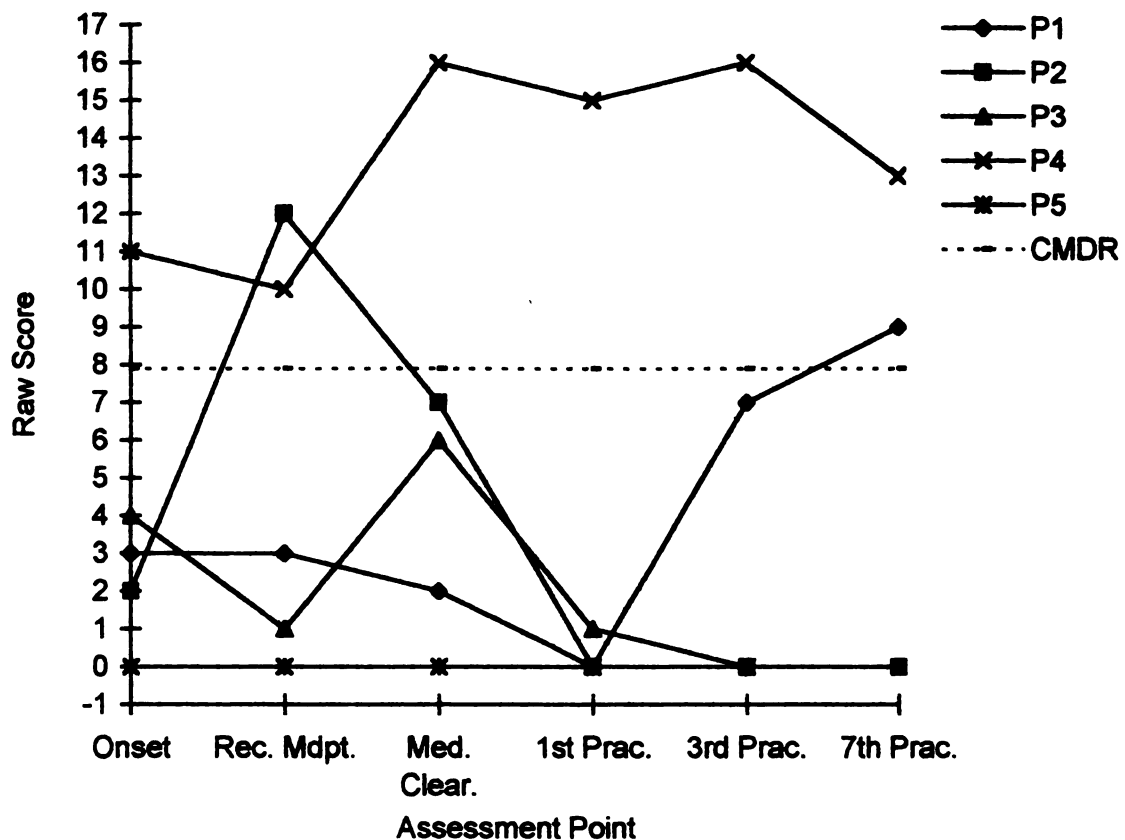


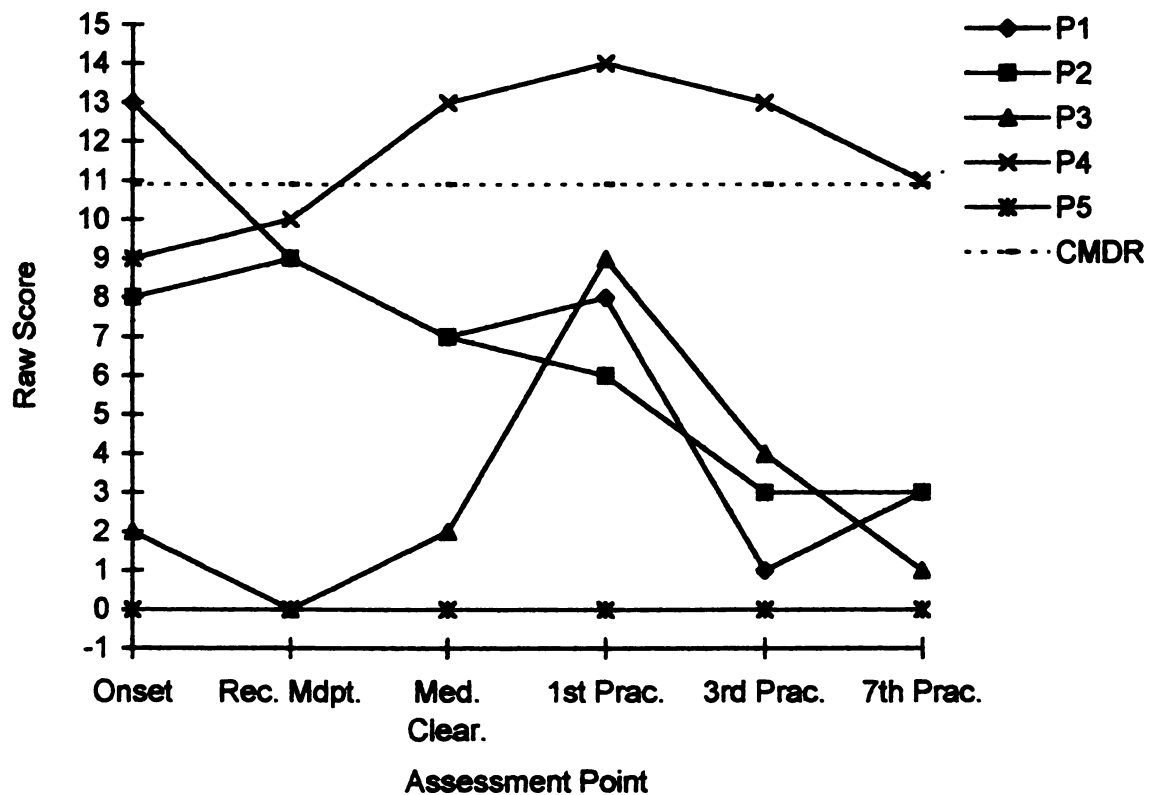
APPENDIX M

Athlete's Raw Score Means of POMS Subscales at each Assessment Point of the Study











APPENDIX N

Raw Data

	id	age	gender	ethnic	grade	sport	position
1	6194.00	19.00	2.00	1.00	1.00	1.00	1.00
2	2349.00	18.00	1.00	2.00	1.00	2.00	.00
3	1445.00	21.00	1.00	2.00	4.00	3.00	.00
4	2287.00	21.00	2.00	1.00	2.00	1.00	1.00
5	3283.00	20.00	1.00	2.00	3.00	2.00	.00
6	9046.00	21.00	1.00	1.00	3.00	3.00	.00

	event	schlship	injtype	injloc	frstinj	frstthis	surgery
1	.00	1.00	1.00	1.00	1.00	1.00	2.00
2	.00	2.00	2.00	2.00	1.00	1.00	2.00
3	1.00	1.00	3.00	3.00	2.00	1.00	2.00
4	.00	1.00	1.00	2.00	2.00	2.00	2.00
5	.00	1.00	4.00	2.00	1.00	1.00	1.00
6	2.00	1.00	1.00	2.00	2.00	1.00	1.00

	support	practmis	poms1.01	poms1.02	poms1.03	poms1.04	poms1.05
1	1.00	3.00	.00	3.00	.00	2.00	.00
2	.00	10.00	.00	.00	1.00	2.00	.00
3	2.00	20.00	2.00	4.00	1.00	2.00	2.00
4	3.00	8.00	1.00	3.00	.00	3.00	2.00
5	3.00	80.00	3.00	3.00	2.00	1.00	3.00
6	3.00	15.00	1.00	3.00	.00	2.00	2.00

	poms1.06	poms1.07	poms1.08	poms1.09	poms1.10	poms1.11	poms1.12
1	.00	.00	2.00	.00	2.00	.00	.00
2	.00	1.00	3.00	.00	3.00	1.00	1.00
3	3.00	3.00	3.00	3.00	3.00	4.00	2.00
4	2.00	.00	2.00	1.00	3.00	.00	1.00
5	.00	4.00	2.00	1.00	1.00	3.00	3.00
6	2.00	3.00	3.00	1.00	3.00	.00	.00

	poms1.13	poms1.14	poms1.15	poms1.16	poms1.17	poms1.18	poms1.19
1	.00	2.00	2.00	.00	.00	.00	.00
2	1.00	.00	1.00	.00	1.00	.00	.00
3	1.00	3.00	4.00	3.00	1.00	.00	.00
4	.00	3.00	.00	1.00	.00	.00	.00
5	3.00	3.00	4.00	2.00	3.00	2.00	2.00
6	.00	1.00	.00	1.00	1.00	1.00	.00

	poms1.20	poms1.21	poms1.22	poms1.23	poms1.24	poms1.25	poms1.26
1	.00	.00	.00	.00	.00	1.00	4.00
2	1.00	.00	1.00	1.00	.00	.00	3.00
3	3.00	1.00	1.00	.00	.00	2.00	3.00
4	3.00	.00	1.00	1.00	.00	.00	2.00
5	1.00	2.00	2.00	2.00	4.00	4.00	.00
6	4.00	1.00	.00	.00	.00	2.00	2.00

	poms1.27	poms1.28	poms1.29	poms1.30	poms2.01	poms2.02	poms2.03
1	3.00	.00	.00	2.00	.00	.00	.00
2	2.00	.00	.00	2.00	.00	.00	.00
3	2.00	.00	1.00	.00	3.00	.00	.00
4	2.00	1.00	.00	1.00	2.00	2.00	3.00
5	.00	1.00	4.00	1.00	1.00	2.00	2.00
6	3.00	.00	.00	3.00			

	poms2.04	poms2.05	poms2.06	poms2.07	poms2.08	poms2.09	poms2.10
1	2.00	.00	.00	.00	2.00	.00	1.00
2	4.00	.00	.00	.00	3.00	.00	2.00
3	2.00	2.00	.00	1.00	2.00	.00	2.00
4	3.00	1.00	1.00	.00	3.00	1.00	3.00
5	2.00	3.00	2.00	3.00	1.00	2.00	2.00
6							

	poms2.11	poms2.12	poms2.13	poms2.14	poms2.15	poms2.16	poms2.17
1	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	1.00
3	2.00	2.00	.00	3.00	3.00	1.00	1.00
4	.00	1.00	3.00	2.00	.00	1.00	2.00
5	1.00	3.00	1.00	3.00	3.00	3.00	4.00
6							

	poms2.18	poms2.19	poms2.20	poms2.21	poms2.22	poms2.23	poms2.24
1	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	1.00	.00	.00
3	.00	1.00	3.00	.00	1.00	1.00	.00
4	1.00	3.00	4.00	1.00	1.00	2.00	.00
5	2.00	2.00	1.00	1.00	3.00	2.00	3.00
6							

	poms2.25	poms2.26	poms2.27	poms2.28	poms2.29	poms2.30	poms3.01
1	.00	4.00	2.00	.00	.00	1.00	.00
2	.00	3.00	3.00	.00	.00	3.00	2.00
3	.00	2.00	2.00	1.00	2.00	.00	.00
4	.00	2.00	3.00	2.00	2.00	2.00	2.00
5	2.00	1.00	1.00	2.00	4.00	2.00	2.00
6							

	poms3.02	poms3.03	poms3.04	poms3.05	poms3.06	poms3.07	poms3.08
1	.00	.00	2.00	.00	.00	.00	2.00
2	.00	2.00	2.00	.00	.00	.00	3.00
3	.00	.00	3.00	1.00	1.00	3.00	3.00
4	2.00	3.00	3.00	1.00	1.00	1.00	3.00
5	3.00	3.00	22.00	4.00	3.00	2.00	4.00
6							

	poms3.09	poms3.10	poms3.11	poms3.12	poms3.13	poms3.14	poms3.15
1	.00	3.00	.00	.00	.00	.00	.00
2	1.00	2.00	.00	.00	1.00	.00	1.00
3	2.00	2.00	.00	.00	1.00	3.00	1.00
4	1.00	2.00	.00	1.00	1.00	1.00	.00
5	3.00	2.00	2.00	2.00	4.00	4.00	3.00
6							

	poms3.16	poms3.17	poms3.18	poms3.19	poms3.20	poms3.21	poms3.22
1	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	1.00	.00	.00	1.00
3	3.00	3.00	1.00	.00	3.00	3.00	1.00
4	1.00	1.00	1.00	2.00	2.00	1.00	.00
5	3.00	4.00	3.00	3.00	3.00	2.00	3.00
6							

	poms3.23	poms3.24	poms3.25	poms3.26	poms3.27	poms3.28	poms3.29
1	.00	.00	.00	4.00	3.00	.00	.00
2	1.00	.00	.00	2.00	2.00	.00	.00
3	.00	.00	.00	2.00	2.00	.00	.00
4	1.00	.00	.00	2.00	3.00	2.00	2.00
5	3.00	1.00	.00	2.00	2.00	3.00	4.00
6							

	poms3.30	poms4.01	poms4.02	poms4.03	poms4.04	poms4.05	poms4.06
1	3.00	.00	.00	.00	2.00	.00	.00
2	2.00	4.00	2.00	1.00	2.00	1.00	.00
3	1.00	3.00	2.00	.00	1.00	.00	.00
4	2.00	2.00	1.00	.00	3.00	1.00	1.00
5	2.00	2.00	3.00	3.00	1.00	4.00	3.00
6	.	.	.	.	.	.	.

	poms4.07	poms4.08	poms4.09	poms4.10	poms4.11	poms4.12	poms4.13
1	.00	3.00	.00	2.00	.00	.00	.00
2	2.00	3.00	1.00	3.00	2.00	2.00	.00
3	2.00	2.00	3.00	2.00	.00	1.00	.00
4	1.00	3.00	1.00	3.00	.00	1.00	.00
5	3.00	4.00	3.00	3.00	2.00	3.00	3.00
6	.	.	.	.	.	.	.

	poms4.14	poms4.15	poms4.16	poms4.17	poms4.18	poms4.19	poms4.20
1	1.00	.00	.00	.00	.00	.00	.00
2	3.00	4.00	1.00	1.00	.00	.00	2.00
3	3.00	2.00	2.00	3.00	.00	.00	2.00
4	1.00	.00	.00	.00	.00	.00	2.00
5	4.00	3.00	3.00	4.00	2.00	3.00	3.00
6	.	.	.	.	.	.	.

	poms4.21	poms4.22	poms4.23	poms4.24	poms4.25	poms4.26	poms4.27
1	.00	.00	.00	.00	1.00	4.00	3.00
2	1.00	.00	.00	.00	.00	3.00	2.00
3	2.00	.00	.00	1.00	1.00	.00	.00
4	1.00	.00	.00	.00	.00	3.00	3.00
5	3.00	3.00	3.00	2.00	3.00	2.00	2.00
6	.	.	.	.	.	.	.

	poms4.28	poms4.29	poms4.30	poms5.01	poms5.02	poms5.03	poms5.04
1	.00	.00	.00	.00	.00	.00	1.00
2	1.00	.00	2.00	2.00	1.00	.00	3.00
3	2.00	1.00	.00	.00	.00	2.00	.00
4	1.00	2.00	2.00	.00	.00	.00	3.00
5	2.00	4.00	2.00	2.00	2.00	3.00	2.00
6	.	.	.	.	.	.	.

	poms5.05	poms5.06	poms5.07	poms5.08	poms5.09	poms5.10	poms5.11
1	.00	.00	.00	2.00	.00	1.00	.00
2	1.00	.00	1.00	3.00	1.00	3.00	1.00
3	2.00	.00	2.00	2.00	1.00	1.00	.00
4	.00	.00	.00	3.00	.00	3.00	.00
5	4.00	2.00	3.00	4.00	3.00	3.00	2.00
6	.	.	.	.	.	.	.

	poms5.12	poms5.13	poms5.14	poms5.15	poms5.16	poms5.17	poms5.18
1	.00	.00	.00	.00	.00	.00	.00
2	1.00	.00	1.00	2.00	.00	1.00	.00
3	1.00	2.00	2.00	.00	.00	3.00	.00
4	.00	.00	.00	.00	.00	.00	.00
5	3.00	4.00	4.00	3.00	3.00	4.00	1.00
6	.	.	.	.	.	.	.

	poms5.19	poms5.20	poms5.21	poms5.22	poms5.23	poms5.24	poms5.25
1	.00	.00	.00	.00	.00	.00	.00
2	.00	1.00	1.00	.00	.00	.00	.00
3	2.00	.00	.00	1.00	.00	.00	.00
4	.00	3.00	.00	.00	.00	.00	.00
5	3.00	3.00	3.00	3.00	3.00	2.00	3.00
6	.	.	.	.	.	.	.

	poms5.26	poms5.27	poms5.28	poms5.29	poms5.30	poms6.01	poms6.02
1	.00	1.00	.00	.00	.00	.00	.00
2	3.00	3.00	1.00	.00	3.00	1.00	.00
3	2.00	1.00	.00	1.00	.00	2.00	3.00
4	3.00	3.00	.00	3.00	2.00	.00	.00
5	2.00	2.00	3.00	4.00	2.00	2.00	3.00
6	.	.	.	.	.	.	.

	poms6.03	poms6.04	poms6.05	poms6.06	poms6.07	poms6.08	poms6.09
1	.00	2.00	.00	.00	.00	3.00	.00
2	.00	3.00	.00	.00	.00	3.00	.00
3	2.00	2.00	.00	.00	.00	2.00	1.00
4	.00	3.00	.00	1.00	.00	3.00	2.00
5	3.00	2.00	2.00	2.00	3.00	4.00	2.00
6	.	.	.	.	.	.	.

	poms6.10	poms6.11	poms6.12	poms6.13	poms6.14	poms6.15	poms6.16
1	2.00	.00	.00	.00	.00	.00	.00
2	4.00	1.00	.00	.00	1.00	1.00	.00
3	3.00	.00	1.00	3.00	1.00	1.00	.00
4	3.00	.00	.00	.00	.00	.00	.00
5	3.00	1.00	2.00	3.00	3.00	1.00	2.00
6							

	poms6.17	poms6.18	poms6.19	poms6.20	poms6.21	poms6.22	poms6.23
1	.00	.00	.00	.00	.00	.00	.00
2	.00	.00	.00	.00	.00	.00	.00
3	3.00	.00	2.00	.00	.00	1.00	1.00
4	.00	.00	.00	2.00	.00	.00	.00
5	4.00	2.00	3.00	3.00	3.00	2.00	2.00
6							

	poms6.24	poms6.25	poms6.26	poms6.27	poms6.28	poms6.29	poms6.30
1	.00	.00	4.00	3.00	.00	.00	.00
2	.00	.00	3.00	3.00	.00	.00	.00
3	.00	1.00	2.00	1.00	1.00	1.00	1.00
4	.00	.00	3.00	3.00	1.00	1.00	1.00
5	1.00	1.00	3.00	3.00	2.00	4.00	3.00
6							

	oe1.1	oe1.2	oe1.3	oe1.4	oe1.5	oe1.6	oe1.7
1	10.00	10.00	10.00	10.00	10.00	10.00	10.00
2	8.00	9.00	8.00	9.00	10.00	10.00	7.00
3	8.00	8.00	.00	8.00	8.00	8.00	8.00
4	7.00	7.00	8.00	7.00	8.00	9.00	8.00
5	2.00	2.00	10.00	10.00	10.00	10.00	10.00
6	2.00	8.00	7.00	8.00	9.00	9.00	9.00

	oe1.8	oe1.9	oe2.1	oe2.2	oe2.3	oe2.4	oe2.5
1	10.00	80.00	10.00	10.00	10.00	10.00	10.00
2	8.00	70.00	9.00	10.00	8.00	9.00	9.00
3	8.00	.00	4.00	8.00	7.00	8.00	8.00
4	8.00	40.00	9.00	9.00	9.00	9.00	9.00
5	10.00	10.00	10.00	10.00	8.00	10.00	9.00
6	9.00	30.00					

	oe2.6	oe2.7	oe2.8	oe2.9	oe3.1	oe3.2	oe3.3
1	10.00	10.00	10.00	80.00	10.00	10.00	10.00
2	9.00	8.00	8.00	70.00	8.00	9.00	9.00
3	8.00	8.00	8.00	75.00	7.00	.00	8.00
4	9.00	9.00	9.00	70.00	9.00	9.00	10.00
5	10.00	10.00	10.00	40.00	10.00	9.00	10.00
6							

	oe3.4	oe3.5	oe3.6	oe3.7	oe3.8	oe3.9	oe4.1
1	10.00	10.00	10.00	10.00	10.00	80.00	10.00
2	8.00	8.00	8.00	7.00	7.00	70.00	7.00
3	9.00	5.00	6.00	8.00	8.00	98.00	8.00
4	10.00	10.00	10.00	10.00	10.00	80.00	10.00
5	10.00	10.00	10.00	10.00	10.00	70.00	10.00
6							

	oe4.2	oe4.3	oe4.4	oe4.5	oe4.6	oe4.7	oe4.8
1	10.00	10.00	10.00	10.00	10.00	10.00	10.00
2	8.00	5.00	8.00	9.00	9.00	7.00	7.00
3	9.00	9.00	10.00	8.00	8.00	8.00	8.00
4	10.00	10.00	10.00	10.00	10.00	10.00	10.00
5	10.00	10.00	10.00	10.00	10.00	10.00	10.00
6							

	oe4.9	oe5.1	oe5.2	oe5.3	oe5.4	oe5.5	oe5.6
1	80.00	10.00	10.00	10.00	10.00	10.00	10.00
2	50.00	8.00	9.00	8.00	8.00	9.00	9.00
3	99.00	9.00	10.00	10.00	10.00	8.00	10.00
4	90.00	10.00	10.00	10.00	10.00	10.00	10.00
5	70.00	10.00	10.00	10.00	10.00	10.00	10.00
6							

	oe5.7	oe5.8	oe5.9	oe6.1	oe6.2	oe6.3	oe6.4
1	10.00	10.00	80.00	10.00	10.00	10.00	10.00
2	8.00	8.00	70.00	8.00	9.00	8.00	9.00
3	9.00	9.00	99.00	9.00	10.00	10.00	10.00
4	10.00	10.00	90.00	10.00	10.00	10.00	10.00
5	10.00	10.00	80.00	10.00	10.00	10.00	10.00
6							

	oe6.5	oe6.6	oe6.7	oe6.8	oe6.9	sc1.1	sc1.2
1	10.00	10.00	10.00	10.00	80.00	.00	10.00
2	9.00	9.00	8.00	8.00	80.00	.00	9.00
3	9.00	10.00	9.00	9.00	100.00	9.00	9.00
4	10.00	10.00	10.00	10.00	95.00	8.00	5.00
5	10.00	10.00	10.00	10.00	90.00	1.00	1.00
6						3.00	3.00

	sc1.3	sc1.4	sc1.5	sc1.6	sc1.7	sc1.8	sc2.1
1	5.00	2.00	.00	10.00	10.00	.00	10.00
2	9.00	10.00	.00	10.00	10.00	.00	.00
3	10.00	7.00	5.00	7.00	7.00	5.00	9.00
4	4.00	4.00	3.00	3.00	4.00	3.00	8.00
5	2.00	.00	.00	.00	.00	.00	5.00
6	2.00	2.00	2.00	2.00	2.00	.00	

	sc2.2	sc2.3	sc2.4	sc2.5	sc2.6	sc2.7	sc2.8
1	10.00	6.00	5.00	.00	10.00	10.00	5.00
2	9.00	9.00	10.00	.00	10.00	10.00	.00
3	9.00	9.00	7.00	5.00	8.00	.00	5.00
4	8.00	8.00	7.00	6.00	7.00	8.00	6.00
5	9.00	10.00	1.00	.00	9.00	9.00	.00
6							

	sc3.1	sc3.2	sc3.3	sc3.4	sc3.5	sc3.6	sc3.7
1	7.00	10.00	10.00	7.00	7.00	10.00	10.00
2	.00	9.00	9.00	10.00	.00	10.00	10.00
3	10.00	10.00	8.00	9.00	10.00	10.00	10.00
4	9.00	9.00	8.00	8.00	7.00	7.00	8.00
5	10.00	10.00	10.00	10.00	5.00	10.00	10.00
6							

	sc3.8	sc4.1	sc4.2	sc4.3	sc4.4	sc4.5	sc4.6
1	7.00	8.00	10.00	8.00	8.00	8.00	8.00
2	.00	10.00	10.00	7.00	6.00	6.00	10.00
3	8.00	10.00	10.00	10.00	10.00	10.00	10.00
4	7.00	10.00	10.00	9.00	10.00	10.00	10.00
5	5.00	10.00	10.00	10.00	10.00	7.00	10.00
6							

	sc4.7	sc4.8	sc5.1	sc5.2	sc5.3	sc5.4	sc5.5
1	10.00	8.00	10.00	10.00	8.00	8.00	8.00
2	10.00	7.00	10.00	10.00	8.00	7.00	7.00
3	10.00	9.00	10.00	10.00	10.00	10.00	9.00
4	10.00	10.00	10.00	10.00	10.00	10.00	10.00
5	10.00	5.00	10.00	10.00	10.00	10.00	8.00
6							

	sc5.6	sc5.7	sc5.8	sc6.1	sc6.2	sc6.3	sc6.4
1	10.00	10.00	8.00	9.00	10.00	9.00	9.00
2	10.00	10.00	8.00	10.00	10.00	8.00	8.00
3	10.00	10.00	9.00	10.00	10.00	10.00	10.00
4	10.00	10.00	10.00	10.00	10.00	10.00	10.00
5	10.00	10.00	7.00	10.00	10.00	10.00	10.00
6							

	sc6.5	sc6.6	sc6.7	sc6.8
1	9.00	9.00	9.00	9.00
2	8.00	10.00	10.00	9.00
3	10.00	10.00	10.00	10.00
4	10.00	10.00	10.00	10.00
5	8.00	10.00	10.00	7.00
6				

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