

**Psychological Responses and Adjustments to Sport Injuries by  
Varsity Athletes**

by

**Nikala N. Chute**

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in conformity with the requirements  
for the degree of Master of Arts**

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## Abstract

Sport injuries pervade the lives of athletic participants. The emotional impact suffered by injured athletes is not fully understood and has perhaps been underestimated. This study examined the affective responses and adjustments of varsity athletes to sport injuries. In a prospective investigation, athletes ( $N = 269$ ) completed The Profile of Mood States and Rosenberg Self-Esteem Inventory pre-season, immediately post-injury occurrence ( $n = 30$ ) and one week post-injury adjustment ( $n = 7$ ). Self-esteem was reportedly high and remained unchanged. Paired t-tests revealed significant post-injury decreases in vigor, notable decreases in fatigue, and increases in depression immediately following the injury episode. Repeated measures ANOVA revealed a continuation of mood disturbance. Specifically, vigor continued to decline significantly and depression remained elevated one week post-injury. These results support the general observation that injured athletes do experience emotional disturbance. The present findings are especially meaningful upon consideration of the mild to moderate nature of the injuries experienced. The significance of sport involvement ascribed by athletes combined with the contextual parameters of participation are hypothesized to be important factors in the mediation of psychological responses.

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## Introduction

Few athletes escape physical injury. Injury threatens an athlete's physical, social and emotional well-being (Heil, 1993). Several investigators have established the importance of psychological factors in response to and recovery from sport injuries (Gordon, Milios & Grove, 1991; Hodge & McNair, 1990). This finding has meaningful implications for sport medicine professionals who have been trained to attend to the physical aspects of rehabilitation but have typically overlooked psychological recovery (Hodge & McNair). There appears to be a serious void in the delivery of research to practical settings. Health-care professionals feel inadequately prepared to recognize and manage psychological concerns. A survey of sport physiotherapists ( $N = 66$ ) revealed that 84 percent felt their training in psychology was insufficient and 87 percent indicated that they would welcome such information (Gordon et al.). This finding elucidates why these professionals, who have the most frequent interactions with injured athletes, reported that athletes should seek support from other professionals to discuss emotional problems (Gordon et al.). Clearly, there is a need to inform health-care professionals about the psychological needs of their injured athletes. Early detection of problematic adjustment can facilitate timely intervention which may prevent behavioral complications in rehabilitation. It therefore behooves the composite of health and sport medicine professionals who care for injured athletes, to become cognizant of the psychological reactions and adjustments commonly experienced (Eldridge, 1983; Hodge & McNair; Uemukai, 1993).

The psychological impact suffered by injured athletes is clearly not understood and is perhaps greatly underestimated. Athletes have been found to overestimate the seriousness of their injuries while trainers tended to underestimate the amount of disruptive impact experienced (Crossman & Jamieson, 1985). Gordon et al. (1991) found that all types of injuries required "more than a moderate level of adjustment" (p.55). Although physical rehabilitation may proceed satisfactorily, emotional disturbance may remain undetected (Eldridge, 1983). According to Larson, Starkey & Zaichowsky (1996), forty-seven percent of athletic trainers ( $N = 499$ ) surveyed reported that "every injured athlete suffers psychological trauma" (p.37). Considering the amount of investment committed athletes place in their sport, it is not astonishing that an unexpected injury may be perceived as a traumatic event (Williams & Roepke, 1993). Athletes' perceptions of their injuries must not be discounted.

Several investigators (McDonald & Hardy, 1990; Smith, Scott, O'Fallon, & Young, 1990a; Smith et al., 1993) have reported significant mood disturbances immediately following injury onset, which endured over the period of adjustment. Additional research suggests that injuries may cause emotional disruption in excess of what one might expect. Strikingly, some injured athletes may experience a period of emotional distress severe enough to warrant clinical intervention (Brewer, Linder, & Phelps, 1995; Leddy, Lambert, & Ogles, 1994) and even attempt suicide (Smith & Milliner, 1994). In light of this research, further exploration of the psychological reactions characteristically seen in injured athletic populations is clearly merited (Williams & Roepke, 1993).

The following review of literature will seek to familiarize the reader with contemporary literature in the psychology of sport injuries and provide a framework for understanding the psychological responses and adjustments to sport injuries by varsity athletes. Possible explanations for the intensity of emotions experienced will be explored through an appreciation of the personal meaning the athlete has ascribed to his/her sport involvement. Subsequently, injury viewed as a significant loss will be discussed with respect to the challenges an athlete experiences to his/her self-esteem. Reaction to loss will be examined as a grieving process that occurs in stages; various stage models will be discussed. Lazarus and Folkman's (1984) Transactional Theory of Stress and Cognitive Appraisal will be examined, followed by a synopsis of cognitive appraisal models specific to the experiences of injured athletes. Both types of models will be critiqued in light of empirical research. An overview of literature specific to the emotional responses to athletic injury will follow. Finally, a brief summary will draw together central issues and set the scene for the research questions and hypotheses central to this thesis.

## Review of Literature

### Personal Meaning

To fully appreciate the intensity of emotions an injured athlete may be experiencing, it is imperative to understand the injury from the athlete's perspective. Williams and Roepke (1993) recommend exploration of the assigned meaning of an athlete's sport involvement. Meaningfulness may be determined, in part, by the depth of commitment and investment involved. Lazarus and Folkman (1984) contend familiarity with an individual's commitments facilitate the identification of areas of vulnerability. Accordingly, "the most damaging life events are those in which central and extensive commitments are lost" (p.63). Success in athletics demands commitment and focus, requiring that athletes make sacrifices in pursuit of their sport aspirations. It is thus conceivable how an unexpected injury may be perceived as a significant threat. Deutsch (1985) asserts that even minor physical injuries may be psychologically debilitating if the injury has symbolic meaning and endangers continued involvement. Injured athletes then, are prone to experience unique losses (Eldridge, 1983).

### Loss and Self-Esteem

Loss is both a real and symbolic event (Peretz, 1970). Simos (1977) contends that losses are phenomenological; "defined in terms of the meaning to the bereaved and not the observer" (p.339). It is therefore crucial that the intensity of loss felt by the athlete is understood. Injured athletes are believed to be especially apt to experience a loss of some aspect of the self (Astle, 1986). Peretz (1970) asserts that injury threatens an individual's self-image and self-esteem. Self-esteem is considered a multifaceted model of self-worth including

physical, emotional, social and academic components (Fleming & Courtney, 1984). An investigation by McGowan, Pierce, Williams & Eastman (1994) revealed that athletes suffered a diminution of affect and feelings of self-worth following traumatic injury. Athletes experience success, recognition and validation through sport participation. For some athletes, an inability to participate may constitute "a loss of their primary means of self-fulfillment" (Parham, 1993, p.416). Self-esteem is closely related to athletic success (Parham), and therefore becomes threatened when an athlete's sense of self-worth is contrived solely from his/her sport image. Eldridge (1983) believes physical injury constitutes a "narcissistic insult" to an athlete's body image. Athletes are also prone to experience a loss of social roles (Astle, 1986), and identity from sport injuries.

#### Athletic Identity

Brewer, Van Raalte and Linder (1993) consider individuals with strong and exclusive athletic identities to be more emotionally vulnerable when injuries strike. This contention is supported by Kleiber, Greendorfer, Blinde and Samdahl (1987) who found that intercollegiate athletes who suffered career-ending injuries, reported lower life satisfaction than athletes of similar status, whose careers did not end prematurely. When an athlete is injured, he/she is abruptly removed from a gratifying and reinforcing social environment. The associated loss of self-definition has been demonstrated to have dramatic effects and makes the athlete inclined to react emotionally (Brewer et al.).

#### Reactions to Loss: Grief

Grief may be described as intense anguish in reaction to a loss (Simos, 1977). According to Evans and Hardy (1995) the greater the investment, the more likely the

individual is to feel threatened by that loss and respond emotionally. Emotional reactions to the experience of loss may be viewed as a grieving process. Several authors endorse the application of Kubler-Ross's (1969) five stage grief model to the reactions of injured athletes (Astle, 1986; Gordon & Lindergren, 1990; Gordon et al., 1991; Lynch, 1988; McDonald & Hardy, 1990; Rotella & Heyman, 1986; Uemukai, 1993). Kubler-Ross's model of Death and Dying is premised on a predictable sequence of stages. 'Denial' is the first stage in which the patient experiences the initial shock of the situation. This stage is theorized to serve as a defense coping mechanism, such that this disbelief protects the individual until he/she is better able to manage and process threatening information. 'Anger' characterizes the next stage, whereby the patient becomes more cognizant of the realities of the situation and feels unjustly served. 'Bargaining' then enters as the patient attempts to distance him/herself from the situation. He/she makes promises to higher powers in the hope of returning things back to the way they used to be. 'Depression' eventually sets in as bargaining attempts fail and the patient adopts a sense of hopelessness. Finally, 'Acceptance' is believed to prevail as the patient seeks ways to actively cope with the adversity of the situation.

Seventy-seven percent of physiotherapists ( $N = 66$ ) reported observable behaviors and psychological reactions resembling Kubler-Ross's (1969) proposed grief model during the treatment of injured athletes (Gordon et al., 1991). Specifically, they found 'bargaining' and 'denial' were observed more frequently than 'depression' and 'anger', and all were rated "greater than moderately indicative of poor behavioral response" (p. 54) to injury. Failure to reach acceptance was interpreted by therapists in this study as "dysfunctional behavior . . . confirming the grief response stages as outlined" (p. 54). Nevertheless, this study failed to

report the sequence, duration or extent of oscillation among stages. Moreover, it is possible that the failure of athletes to reach 'acceptance', illustrates the likelihood that stage models lack predictive power not the conclusion proposed. Gordon and Lindgren (1990) found additional support for the 'grief response' in a case study of an elite bowler. In this investigation, 'acceptance' was exhibited but 'bargaining' was absent. Again, the investigators neglected to report the duration of stages and accepted the model as "confirmed" without attempting to account for the non-appearance of one of the model's stages.

Uemukai (1993) applied Kubler-Ross's (1969) psychological stages to the affect recovery process of injured athletes ( $N = 212$ ). Interestingly, 'Denial' was expressed by athletes who suffered 'light' but not 'serious' injuries. 'Anger' was intensely expressed by seriously injured athletes who felt the possibility of recovery was low. Anger was most pronounced immediately following injury onset and endured for approximately two weeks. 'Bargaining' was consistently expressed during the recovery process. 'Depression' was strongly expressed among seriously injured athletes, two to four weeks from the day the injury was experienced, when recovery was uncertain. 'Acceptance' was expressed by all athletes, one month into recovery. However, acceptance was not expressed among seriously injured athletes ( $n = 26$ ) within two weeks from the day of the injury and when athletes felt the likelihood of recovery was low. Finally, although not included in Kubler-Ross's model, impatience was intensely expressed by athletes who experienced serious injuries. With the exception of denial, the "Affect Recovery Process Scale" developed by Uemukai tended to support Kubler-Ross's theoretical stage model for seriously injured athletes.

The notion of a stereotypical pattern of stages has not been empirically established (Brewer, 1994). Recent longitudinal studies in the sport psychology literature have enabled observation of emotions as they unfold. Research by several authors (McDonald & Hardy, 1990; Smith et al., 1990a; & Smith et al., 1993) found athletes experienced intense emotional disturbance following severe injuries that diminished over time. The negative affect experienced in both studies appeared to be global in nature as measured by the Profile of Mood States (POMS). Cross-sectional studies further supported similar global affective responses (Chan & Grossman, 1988; Pearson & Jones, 1992). Smith et al. (1990a) noted a lack of discrete stages and the absence of denial in their investigation. McDonald and Hardy proposed an alternative model of impact, retreatment and acknowledgment (to be discussed later) to interpret their findings.

Brewer (1994) argues against the usefulness of unsubstantiated stage models which lack predictive value. Furthermore, since this model of Death and Dying (Kubler-Ross, 1969) was derived from research with terminally ill patients, one could challenge the application of it to understanding the reactions and adjustments of such mismatched populations. Several researchers (Brewer, 1994; Evans & Hardy, 1995; Pearson & Jones, 1992; Rose & Jevne, 1993; & Smith et al., 1990a) have questioned the appropriateness of Kubler-Ross's (1969) psychological stage model in athletic injury research and support the investigation of alternative models.

Other stage models have been proposed but not empirically tested. McDonald and Hardy's (1990) Reactive-Adaptive Model involves a two stage process. Impact characterizes the first stage, in which reactions of shock and encounter are intense but brief. Shock entails

feelings of detachment, while encounter constitutes panic, disorganization and helplessness. The second stage is entitled retreatment and acknowledgment, wherein the athletes retreat into either illness or health. Acknowledgment describes a cyclic process of approach and avoidance.

Heil (1993) proposes a three element repeating Affective Cycle in response to athletic injury. 'Distress' describes emotional disruption and disorganization and includes: shock, guilt, humiliation, preoccupation and helplessness. 'Denial' is characterized by a sense of disbelief or failure to accept the severity or implications of the injury. Heil stresses denial exists on a continuum and may be adaptive in some instances or interfere with rehabilitation in others. Denial is hypothesized to protect the athlete through delaying the processing of distressing emotions. Denial is perceived to be useful in assisting athletes to cope in the short-term. Denial becomes problematic when it prevents the athlete from "the emotional work of recovery" (Heil, 1993, p. 40). Finally, 'Determined Coping' suggests acceptance and is identifiable through purposeful coping. Heil explains distress and denial most often characterize initial adjustment, while determined coping is predominantly evident in the later stages of recovery. Further, shifts between elements may occur at any time and are tied to specific experiences such as setbacks or flare-ups. Finally, oscillation between stages is variable and subject to the athlete's perception of progress.

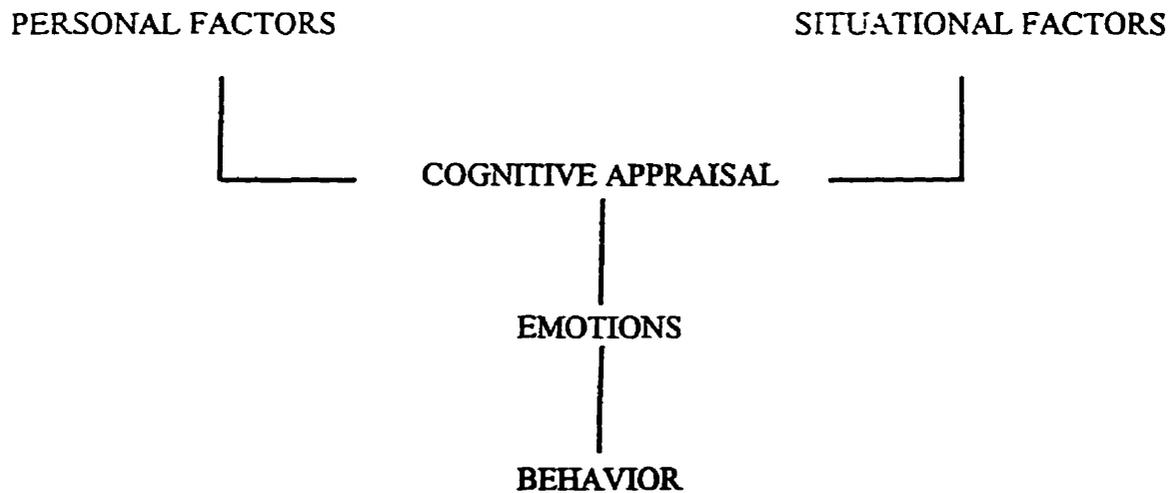
Rose and Jevne (1993) developed a four phase risk model of the psychosocial process associated with moderate to severe athletic injuries. Phase 1, entitled 'Getting Injured', was believed to occur as a result of the pre-injury context. Phase 2: 'Acknowledging the Injury' was demonstrated on a denial - acceptance continuum. Denial

was characterized as ignoring the injury, while acceptance consisted of an acknowledgement of the seriousness of the injury and need for treatment. Bargaining rested in the middle of the continuum whereby athletes would endure persistent pain or loss of stability to a point upon which acceptance was achieved. Phase 3: 'Dealing with the Impact' described the period in which athletes psychologically adapted or adjusted to their injury. In this phase, athletes dealt with their emotions, reorganized their lifestyles, engaged in physical healing behaviors, and coped with perceived changes to self-concepts and self-images. The last phase was labeled 'Achieving a Physical and Psychosocial Outcome'. Within this phase, athletes reevaluated the importance of various lifestyle activities and became cognizant of their physical limitations.

### Cognitive Appraisal Models

Cognitive appraisal is a central concept in stress, coping and emotion research (Lazarus & Folkman, 1984). In Lazarus and Folkman's model, injury constitutes the stressful stimulus. Cognitive appraisal processes mediate thoughts, feelings and actions. Evaluative cognitions intervene between the encounter and the reaction to determine subsequent emotional responses and behavioral outcomes. Therefore, the fact that the event occurred is less important than the way in which it is perceived (Brewer, 1994). This interpretive element helps explain variations in individual reactions to comparable events. The appraisal process is mediated by an interplay of both personal and situational factors. Stress appraisals include harm/loss, threat and challenge. According to Heil (1993), stresses of injury include threats to physical, emotional and social well-being. Personal factors work interdependently with situational factors to determine the extent to which harm/loss, threat, or challenge will be

experienced (see Figure 1).

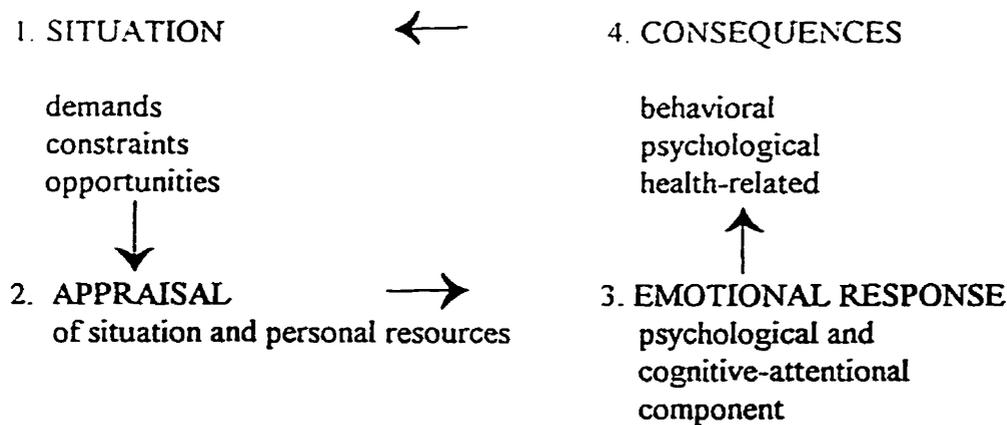



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**Figure 1.** Cognitive appraisal model of psychological adjustment to athletic injury (Brewer, 1994 adapted from Lazarus & Folkman, 1984).

The utility of this model has been demonstrated in other areas in psychology and offers considerable promise in understanding the psychological reactions and adjustments of athletes to sport injuries (Brewer, 1994).

In Weiss & Troxel's Psychophysiological Model (1986), injury is considered the stressor that places demands and constraints on the body to adapt. The individual interprets the stressor as threatening or non-threatening and evaluates his/her ability to cope. The emotional response that follows is manifested in physiological arousal and/or psychological changes. Eventually, performance, health and/or psychological-related consequences emerge (see Figure 2).



**Figure 2.** The Stress Process ( Weiss & Troxel, 1986).

This model of athletic injury was the first to include a cognitive component and interpret injury as a stressor, processed by appraisal mechanisms in which personal and situational factors interact. Trait anxiety and self-esteem are cited examples of intrapersonal factors which have been found to relate to competitive stress (Weiss & Troxel, 1986). Self-motivation is another intrapersonal factor that has been found to influence injury rehabilitation. Situational factors include: time of season in which the injury occurs, the type of sport in which the athlete competes, and external pressures.

Wiese and Weiss (1987) emphasize the importance of understanding the interplay of personal attributes and contextual aspects within which the physical injury occurred. Personal factors, such as self-esteem, trait anxiety, and intrinsic motivation interact with situational factors (nature and extent of injury, type of sport, time during the season in which an injury occurred, and the perceived context of the injurious situation) to shape the athlete's reaction to injury. Wiese and Weiss proposed a simplified version of Weiss and Troxel's (1986) stress model to understanding athletic injury (see Figure 3).



**Figure 3.** Four-stage stress response to athletic injury (Wiese & Weiss, 1987 adapted from Weiss & Troxel, 1986).

Injury signifies the stressor from which a number of responses may ensue. Appraisal processes then evaluate the injury and personal coping resources. It is at this stage that Wiese and Weiss recommend the intervention of a sport psychologist. How the injury is perceived will mediate emotions elicited in the third stage of this model. These theorists contend emotional responses may manifest themselves as physiological arousal, anxiety, or worry. These emotions are hypothesized to cycle back to affect further cognitions concerning the injury. Finally, the behavioral consequence of the psychological responses reveals itself in terms of adherence to rehabilitation regimes. Ultimately, this behavior determines the successfulness of physical recovery.

Wiese-Bjornstal & Smith (1993) extended Andersen & Williams's (1988) Psychosocial Stress Model to include Wiese and Weiss's (1987) stress model of injury response. Andersen & Williams's (1988) model provides an interactional theoretical framework for the prediction and prevention of stress-related injuries. The proposed

model is comprised of four major components: the potentially stressful situation, the cognitive appraisal of various aspects of the situation, the physiological and attentional responses, and the potential injury outcome. The central aspects of the extended model by Wiese-Bjornstal and Smith (1993) “relate to the mediating role of the severity of injury; sport specific situational factors; interactions with the sports medicine team; individual differences and the resultant emotional, cognitive, and behavioral responses of the athlete” (p.152). The authors suggest this model may have clinical utility in the assessment and planning of appropriate interventions (see Figure 4).

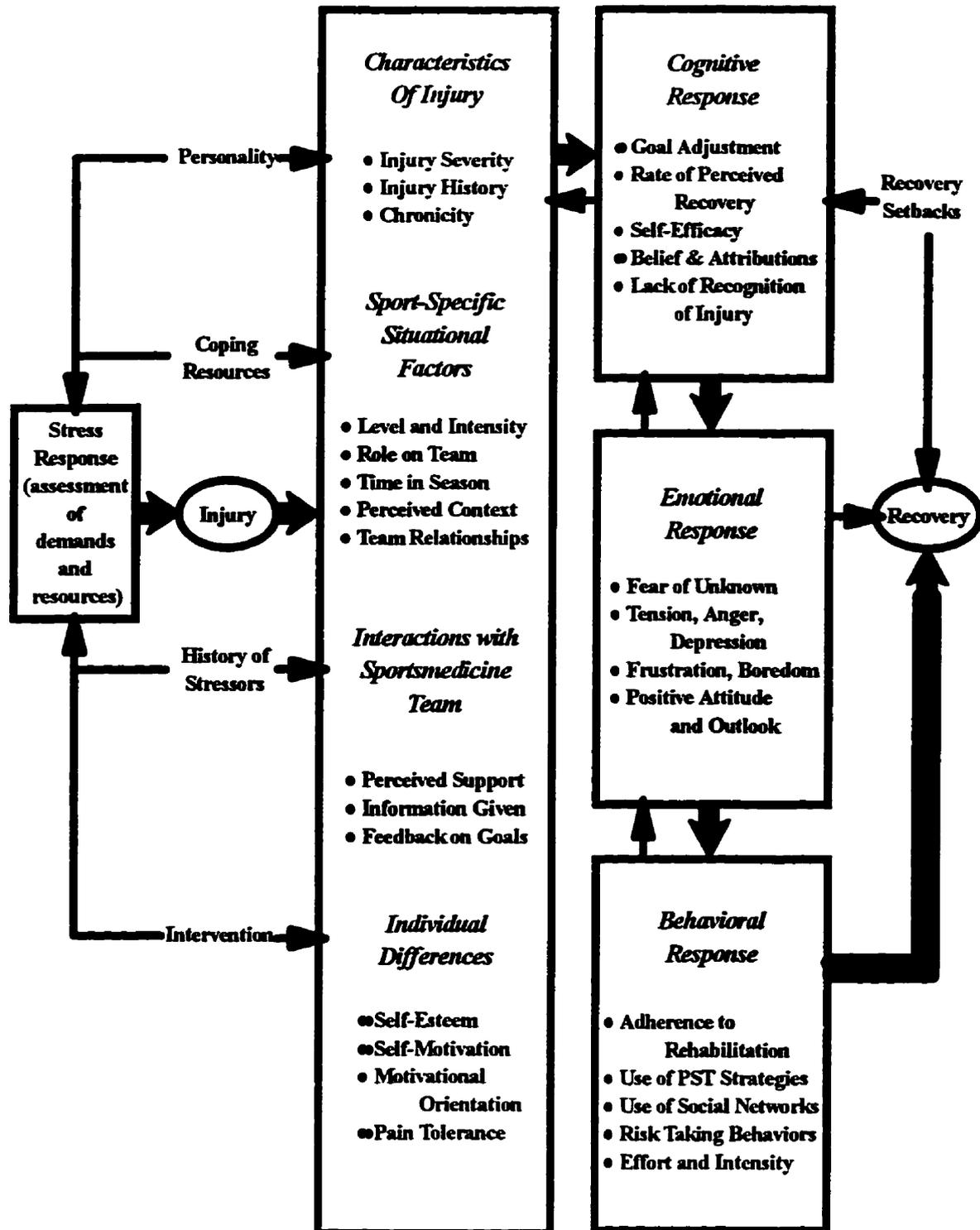


Figure 4. Predictors of cognitive, emotional and behavioral responses of athletes to injury and rehabilitation (Wiese-Bjornstal & Smith, 1993; extended from Andersen and Williams, 1988).

An investigation by Daly, Brewer, Van Raalte, Petitpas and Sklar (1995) attempted to test the viability of cognitive appraisal models through examination of recreational and competitive athletes undergoing rehabilitation following knee surgery ( $N = 31$ ). The athletes appraised their abilities to cope with their injury and completed the POMS. Cognitive appraisal was correlated with emotional disturbance and emotional disturbance was inversely related to adherence to rehabilitation. This study therefore supports the relationship between emotional responses to injury and their subsequent impact upon behavioral responses. The authors caution against causal inferences due to the statistical limitations of the measurements utilized. They further addressed limitations of a small homogeneous sample and endorse future longitudinal studies with diverse samples.

Several studies have provided evidence to support the influence of situational factors on psychological response and recovery. Recovery progress (McDonald & Hardy, 1990) was positively correlated with positive mood states, while severity (Leddy, Lambert & Ogles, 1994; Smith, et al., 1990a; Smith et al., 1993), duration (McDonald & Hardy, Leddy, Lambert & Ogles, 1994; Smith et al., 1990a; Smith et al., 1993), and impairment of daily activity (Crossman & Jamieson, 1985) were inversely related to post-injury emotional adjustment (Brewer, 1994). Brewer, Linder and Phelps (1995) explored the relationships between a variety of situational factors and emotional adjustment to athletic injury. They found that post-injury depression was significantly correlated with physician-rated current injury status, perceived impairment of sport performance and perceived social support for rehabilitation. The application of cognitive appraisal models to athletic injury appears promising, although, further research investigating the viability of cognitive appraisal models is necessary.

### Emotional Responses to Athletic Injury

Research in the area of the emotional responses to athletic injury was initiated by Weiss and Troxel (1986). In an interview format, they asked ten injured elite and collegiate athletes to discuss their most common problems in dealing with injuries. Athletes reported maladaptive self-talk patterns and a tendency to dwell on irrational thoughts, as well as feelings of disbelief, fear, rage and depression. Many of these athletes also reported somatic complaints and expressed difficulty in coping with their injury, long rehabilitation, activity restriction, and the sense of being externally controlled. This original study recognized the mediating role of self-perception and served as an impetus for subsequent research.

In a subsequent investigation of emotions and self-perceptions, Chan and Grossman (1988) explored the psychological effects of restricted activity on committed runners. The researchers administered the POMS and the Rosenberg Self-Esteem Inventory to injured runners in both a 'Prevented Runners' group and a 'Continuing Runners' group. As part of the research design, 'Prevented Runners' were restricted from running for four weeks following a running related injury. A running related injury was defined as "one which would prevent a runner from running but was non-intrusive in routine mobility" (p.877). Groups were matched with similar injuries, the 'Continuing Runners' group, continued to run without interruption. 'Prevented Runners' exhibited significantly greater tension, depression, confusion, and anger, significantly less vigor and lower self-esteem than runners who continued to run while injured. The authors hypothesized that since regular exercise contributes to improved self-esteem, body image, and positive mood states, withdrawal could jeopardize these aspects of emotional well-being. This study has been criticized for its use

of minor injuries (Leddy et al., 1994). However, since loss is defined by the perception of the athlete and not the observer (Simos, 1977), the impact may be similar to that of more seriously injured athletes. Additionally, this study's findings demonstrate emotional disruption despite the use of minor injuries, therefore suggesting, that the length of activity restriction may be one of the critical factors in determining the amount of distress experienced.

Smith et al. (1990a) sought to determine the presence, type, magnitude and time course of emotional responses of injured athletes. They examined 72 recreational athletes at two-week intervals from the time the injury was sustained until their return to full sport participation or four months (whichever came first). The POMS and the Emotional Responses to Injury Questionnaire (ERAIQ, developed by Smith, Scott, & Wiese, 1990b), were administered at injury onset and at two-week intervals. Immediately following injury, the most severely injured athletes ( $n = 23$ ) experienced significantly more tension, depression, anger, and less vigor compared to college norms, a mood disturbance that lasted one month. Investigators acknowledged the lack of pre-injury emotional profiles and the comparison of athletes to college normative data as weaknesses of their study.

Pearson and Jones (1992) combined the methodologies of Chan and Grossman (1988) and Smith et al. (1990a) and attempted to improve these studies by comparing the mood states of 61 injured athletes with those of a non-injured matched group. The updated Bi-polar POMS was utilized to document the athlete's general mood state and the SFAIQ: Sportsmen's Feelings After Injury Questionnaire a modified version of the ERAIQ (Smith et al. 1990b) was administered to index the athletes' feelings related to their injuries. The results of their quantitative study showed injured athletes scored more negatively than non-injured athletes

on every mood sub-scale. Negative sub-scales were labeled: anxious, hostile, depressed, unsure, tired and confused. Pearson and Jones (1992) argued that mood could not be studied accurately and fully by a rating scale. Hence, they decided to complement their quantitative data with qualitative information. A cross-section of six participants were interviewed. They reported experiencing a variety of emotional states including: "general mood swings; irritability; lethargy; a bit down; fatigued, short-tempered and moody; wound-up; angry; and vulnerable at times" (p.766). This qualitative information provides a richer understanding of the emotional impact of sport injuries.

In an attempt to address limitations of their first investigation, Smith et al. (1993) conducted a prospective study to assess the impact of injury on mood state and self-esteem. Their sample consisted of 238 male and 38 females across hockey, basketball, volleyball and baseball teams. These researchers utilized the POMS, the Rosenberg Self-Esteem Inventory and a modified version ERAIQ (Smith et al., 1990b). Researchers collected data pre-season, immediately after an injury occurred and weekly thereafter until activity was resumed. Severity was defined in terms of "duration of non-participation in sports activities" (p. 940). Of the 36 injuries which occurred, 27 were considered minor or moderate (non-participation for one or two weeks) and 9 were classified as severe (non-participation for three or more weeks). The results of paired dependent t-tests with Bonferroni correction revealed significant pre- and post- differences in mood occurrence relative to severity of injury. For the sample as a whole, significant increases in depression and anger and decreased vigor were found in comparison to pre-injury profiles.

Leddy et al. (1994) sought to improve methodological weaknesses of previous studies through an assessment of mood states and self-esteem of both injured and non-injured athletes in a prospective research investigation. Their study involved 340 males across 10 sports. Injured athletes and matched controls were assessed using the Beck Depression Inventory, the State-Trait Anxiety Inventory and the Tennessee Self-Concept Scale. Measures for both injured and control athletes were taken pre-season, immediately following injury and during a two month follow-up. The results of a one-way MANOVA revealed that injured athletes ( $n = 145$ ) experience a period of emotional distress which, in some cases, may be severe enough to warrant clinical intervention. Furthermore, high-level athletes were found to be vulnerable to increased depression and anxiety and decreased self-esteem. Evans and Hardy (1995) have criticized the present study for its insufficient injury definition (one missed game or practice session) and omitting detail in relation to the severity of injuries. This investigation is also limited because of infrequent data collection.

Similar emotional reactions have been documented by McDonald and Hardy (1990) in athletes who experienced severe injuries. The researchers examined the affective response patterns of five intercollegiate athletes within 24 hours of injury onset and twice weekly over four weeks. Severity was defined as an injury that kept the participant out of action at least three weeks. Athletes completed the POMS on non-consecutive days and indicated their perceived percent rehabilitation. At the final meeting, subjects completed an open-ended questionnaire designed to explore affective, cognitive and behavioral reflections about rehabilitation. Pearson Product-Moment correlations were found between perceived percent rehabilitation and total mood disturbance with negative affect diminishing and positive affect

increasing as perceived percent rehabilitation increased. This study provides evidence of the importance of cognitive appraisal processes and supports how emotions can be associated with recovery.

Additional research designed to document changes in affect or feelings of self-worth was conducted by McGowan et al. (1994). This study examined changes from baseline values in intercollegiate football players following a disabling injury. Sixteen of 29 players were injured over the course of the season. Measures were taken pre-season, post-season, and each week of non-participation. Subjects completed the Coopersmith Self-Esteem Inventory. Repeated measures ANOVA revealed a significant decrease in generalized self-concept following athletic injury which persisted through the course of treatment. Interestingly, these investigators reported weekly fluctuations in mean self-concept which appeared to be as a function of team performance in competition. Individual interviews confirmed feelings of alienation and low self-worth when the team was performing well without that individual's contribution. Chan and Grossman (1988) reported a similar decrease in self-esteem in injured runners in contrast to Smith et al. (1990a) who reported no pre-injury to post-injury differences. Self-esteem has been hypothesized to decrease in response to a perceived loss of some aspect of the self (Astle, 1986). McGowan et al. (1994) propose that future studies examine severity or type of injury and change in self-esteem more closely.

Gordon and Lindgren (1990) examined the process of holistic rehabilitation of an elite fast bowler from a serious sport injury. Utilizing a case study approach, the researchers were able to gain a descriptive account of an elite athlete's emotional responses to injury and adjustments in rehabilitation. This athlete had a history of chronic back injury and endured

major back surgery. This case study details the athlete's physical and psychological obstacles encountered during the athlete's recovery. The stages of the athlete's response to injury were reported to resemble stages of denial, anger, depression and acceptance, which according to Gordon and Lindgren confirmed a 'grief response'.

### Summary

Literature in the psychology of sport injuries to date has provided insight into the emotional reactions and adjustments experienced by injured athletes. Research methodologies have evolved overtime to include longitudinal designs which document the unfolding of emotions (McDonald & Hardy, 1990; Smith et al., 1990a; Smith et al., 1993). The development of prospective investigations (Leddy et al., 1994; Smith et al., 1993) have allowed for baseline comparisons and matched control groups (Leddy et al., 1994; Pearson & Jones, 1992) have enabled the inclusion of control group comparisons.

Athletic injury can have debilitating psychological consequences. Corresponding emotional disturbances have been shown to interfere with adherence to rehabilitation programs (Daly et al., 1995) and therefore impair physical recovery. Investigation of the emotional reactions characteristically experienced in injured athletes is beneficial to researchers in sport psychology, as well as, health professionals, trainers, coaches and others who must care for athletes in their physical and psychological recovery.

This study will attempt to expand previous literature by improving upon past methodological weaknesses. Specifically, this investigation will assess a diverse sample of varsity athletes (Daly et al., 1995) in a prospective research design. Baseline data will permit pre- and post- injury comparisons (Evans & Hardy, 1995; Leddy et al., 1994; Smith et al.,

1993) and weekly data collection (McGowan et al., 1994) will attempt to more accurately measure fluctuations in affect (Evans & Hardy, 1995). A recently developed sport population specific affectivity measure (Evans & Hardy, 1996) will also be employed to address recent concerns regarding reliance upon non-population specific measures (Evans, Hardy, & Mullen, 1996). Finally, qualitative data will be collected to address its relative scarcity in athletic injury research to date (Rose & Jevne, 1993).

### Research Questions

The purposes of this investigation are: 1 (a) to determine whether athletes experience a change in mood state immediately following injury and 1 (b) to determine whether mood changes occur over the period of adjustment. Hypothesis 1a: Injured athletes will exhibit negative mood states immediately following injury occurrence. Hypothesis 1b: Injured athletes will experience negative mood states which will persist and further decline over the period of adjustment. (2) To determine if self-esteem is influenced as a result of becoming injured. Hypothesis 2: Injured athletes will suffer diminished self-esteem immediately following injury onset which will endure over the period of adjustment. (3) To determine if the context in which the injury occurred (attribution to self /other) affects the mood states elicited. Due to the exploratory nature of this research question, the hypothesis will be stated in the null form. Hypothesis 3: The context of the injurious situation will not affect the mood states experienced by injured athletes. Finally (4) to employ a recently developed sport specific affectivity measure "The Psychological Responses to Injury Inventory" (Evans & Hardy, 1996) and report preliminary descriptive statistics.

Qualitative research allows detailed understanding of complex psychological processes (Pearson & Jones, 1992). There have been few in-depth descriptions of the experiences of injured athletes (Rose & Jevne, 1993). Athletes who suffer severe injuries will be asked to participate in individual interviews. The aim of this portion of the investigation is to elaborate and expand upon information elicited by the quantitative study.

## Methodology

### Definition of Injury

Tremendous disparity exists in the literature with respect to injury definition which has severely limited the generalizability of results (Evans & Hardy, 1995; Williams & Reopke, 1993). Definition of injury has ranged from one day of non-participation (Smith et al., 1990a; Smith et al., 1993), to at least 7 days of non-participation (Rose & Jevne, 1993), to out of action for at least three weeks (McDonald & Hardy, 1990), while some studies omit this critical information completely (Leddy et al., 1994; Pearson & Jones, 1992).

For the purposes of this study, a minor injury was defined as an injury which precluded participation in training for three to seven days or caused the athlete to miss at least one game. A moderate injury prevented participation in training or competition for 8 to 21 days (Petrie, 1993; Smith et al., 1993) Finally, a severe injury prevented participation for 22 days or longer (Evans & Hardy, 1995; McDonald & Hardy, 1990; Petrie, 1993; Smith et al., 1993).

### Participants

Varsity athletes ( $N = 269$ ) from Queen's University participated in this prospective study. Male ( $n = 171$ ) and female ( $n = 98$ ) athletes from fall and winter sport teams including: football, rugby, soccer, hockey, basketball, volleyball and field hockey teams completed the pre-injury questionnaires preseason (Appendix B). Sports were selected based upon the recommendations of the Head Athletic Therapist at Queen's University. Athletes ranged in age from 18 to 23 years ( $M = 20.35$ ,  $SD = 1.77$ ), and had participated in their respective

sports on average 5.92 years. Twenty-eight athletes experienced a total of 30 injuries (10.4 % injury rate) over the 1996/97 fall season. Classified in terms of severity, 23 were considered minor, 5 were moderate and 2 were classified as severe. For the purpose of analysis, the moderately injured and severely injured groups have been collapsed ( $N = 7$ ).

### Instrumentation

The Profile of Mood States (POMS) developed by McNair, Lorr, and Droppleman (1981) was employed to allow for comparisons to be drawn across studies (Chan & Grossman, 1988; McDonald & Hardy, 1990; Pearson & Jones, 1992; Smith et al., 1990; & Smith et al., 1993; Uemukai, 1993). The POMS is an expeditious method of identifying and assessing transient affective states. It is an easily administered instrument which can be completed in 3 to 5 minutes. The POMS consists of 65 items, scored on a 5-point scale format (0 = not at all to 4 = extremely) and yields six scales: tension/anxiety (TEN), depression/dejection (DEP), anger/hostility (ANG), vigor/activity (VIG), fatigue/inertia (FAT) and confusion/bewilderment (CON). The POMS possesses sound psychometric properties. The above scales have demonstrated validity and reliability, with internal consistencies ranging from .87 to .92 with males and .84 to .90 with females (McNair et al., 1981). The POMS has established normative college data and has been employed extensively in past sport injury research (LeUnes, Hayward, & Daiss, 1988).

The Rosenberg Self-Esteem Inventory (Rosenberg, 1965) has also been utilized in sport injury research (Chan & Grossman, 1988; Smith et al., 1990a). This inventory consists of a 10-item Guttman scale that reflects global self-esteem. Items are presented in a 4-point format, ranging from "1 = strongly agree" to "4 = strongly disagree". Positive and negative

items are alternatively presented to decrease the possibility of a respondent set. Six scales are summed to create a total self-esteem score ranging from 0 (high self-esteem) to 6 (low self-esteem). This instrument has demonstrated satisfactory construct validity and internal reliability, from .85 to .88 (Rosenberg, 1979).

Reliance upon non-population specific measures is believed to have obscured an understanding of the affective responses of injured athletes (Evans, Hardy, & Mullen, 1996). In response to this concern, Evans and Hardy (1996), developed a twenty-five item affectivity measure designed to assess the psychological responses of athletes to injury. The Psychological Responses to Injury Inventory is comprised of five sub-scales labeled 'Devastation', 'Dispirited', 'Reorganization', 'Attempts to Rationalize', and 'Isolation'. Each scale is composed of five items scored on a five point likert scale. Cronbach's (1951) alpha for the sub-scales ranged from .75 to .87, demonstrating acceptable levels of internal consistency.

In attempt to operationalize the athlete's appraisal of the context in which the injury occurred, he/she was asked to respond to Context B and C forms (developed by the investigator). Context B was completed within 48 hours of injury onset. Context C was completed following seven days of non-participation and weekly thereafter until the athlete returned to play (see Appendix B).

The Emotional Responses of Athletes to Injury Questionnaire (Smith et al., 1990b) has been developed for emotional assessment in a prominent sports medicine clinic and has been employed in several research investigations (Pearson & Jones, 1992; Smith et al., 1990a; Smith et al., 1993). Two severely injured athletes were asked to verbally respond to an

adapted version of this questionnaire (see Appendix B) in personal interviews.

### Procedure

A letter of purpose was sent to the Director of Athletics. Upon secured ethics approval, an advisory meeting was held with Head and Assistant Athletic Therapists, which outlined the study's objectives and procedures. A similar meeting with team trainers was also conducted prior to the start of the athletic season. Student trainers were familiarized with the project and study protocol. Protocol information was distributed and posted in the training rooms (Appendix A). Trainers were further reminded about study through e-mail, telephone calls and personal visits to the training room by the investigator. They were strongly encouraged to seek clarification when necessary throughout the season. Coaches were contacted and asked for permission for athletes to complete a package of questionnaires at the beginning of pre-season training. Pre-injury profiles are imperative for baseline comparisons (Evans & Hardy, 1995; Leddy et al., 1994; Smith et al., 1993). A matched control design suggested by Evans and Hardy, Leddy et al., and Pearson and Jones (1992) was not be employed for several reasons. First, conceptually it was felt that affect was not a construct that could be adequately controlled within a matched subject design. Second, since Smith et al. (1990a) contend athletes can serve as their own controls, it was felt that the prospective nature of this study could provide adequate control through baseline comparisons. The investigator administered the pre-injury packages to teams individually at the coaches' convenience. Athletes were verbally informed of the study's purpose and the voluntary nature of their participation (Appendix A). All athletes of the selected sports were recruited to complete Package A. Package A included: a consent form, a demographic data

sheet, The POMS, and The Rosenberg Self-Esteem Inventory. In accordance with procedures of previous studies (Leddy et al., 1994; Smith et al., 1990a; Smith et al., 1993), athletes completed Package B immediately (within 48 hours) following their injuries. Package B contained: the POMS, The Psychological Responses to Injury Inventory, The Rosenberg Self-Esteem Inventory, and the Context B form (Appendix B). Team Trainers distributed these packages at their discretion, to athletes expected to miss practice for at least 3 days or who would miss one game. The athletes completed the questionnaires and returned them in sealed envelopes to ensure confidentiality. Envelopes were deposited in a locked container and collected by the investigator. Team trainers were also requested to notify the investigator of athletes who incurred a serious injury (non-participation for at least three weeks) for interview purposes.

Package C was identical in composition to Package B, with the exception that the Context C (Appendix B) form was a slightly modified version of Context B. Package C was completed each subsequent week following Package B until sport participation was resumed (Smith et al., 1993; McGowan et al., 1994). Weekly assessments were conducted in attempt to better assess fluctuating mood states (Evans & Hardy, 1995).

The consent form completed in the quantitative portion of this study informed subjects about the possibility of participation in individual interviews. Injured athletes that were unable to participate for a minimum of three weeks were contacted by phone. In accordance with Evans and Hardy's (1995) recommendations, these athletes are best suited for assessment of complex patterns and interactions of behavioral, emotional and psychological variables. Participants responded to a set of prepared questions adapted from the Emotional Responses

to Athletic Injury Questionnaire (Smith et al., 1990b) (Appendix B). Qualitative information was sought to elicit in-depth information about the emotional effects of injury (Pearson & Jones, 1992). Questions pertaining to the context in which the injury occurred were also included. Both interviews lasted half an hour on average, they were recorded and subsequently transcribed.

### Statistical Analysis

The Profile of Mood States (McNair et al., 1981) sub-scale scores in this data set were evaluated for internal consistency. Independent t- tests were conducted to compare mean scores of injured ( $n = 30$ ) and non-injured athletes ( $n = 239$ ) at baseline. Independent t-tests were also employed to compare POMS data of male ( $n = 171$ ) and female ( $n = 98$ ) athletes with published college normative data (McNair et al.). The alpha level was set at  $p = .05$ , an adjustment (Bonferroni correction  $.05/6 = .0083$ ) was made to control against the increased probability of a Type I error from multiple comparisons. Multivariate analysis of variance was conducted to analyze for differences between males ( $n = 18$ ) and females ( $n = 12$ ) within the injured athlete group ( $n = 30$ ).

#### Evaluation of Hypothesis 1a

To determine whether athletes ( $n = 30$ ) experienced a change in mood state following injury, paired t-tests were conducted to compare the means of six POMS sub-scales, pre- and post-injury. Again, the Bonferroni correction ( $0.5/6 = .008$ ) was employed.

#### Evaluation of Hypothesis 1b

In order to determine whether mood changes occurred over the period of adjustment, POMS data of moderately and severely injured athletes ( $n = 7$ ) was evaluated pre-injury, immediately post-injury and one week post-injury through repeated measures ANOVA. The alpha level was set at  $p = .05$ .

### Evaluation of Hypothesis 2

Independent  $t$  tests were employed to compare self-esteem scores between the injured ( $n = 29$ ) and non-injured ( $n = 220$ ) groups pre-injury. Paired  $t$ -tests were conducted to determine whether self-esteem changed pre- ( $n = 26$ ) to post- injury ( $n = 26$ ) or subsequently one week later ( $n = 6$ ). The significance level was set at .05.

### Evaluation of Hypothesis 3

A one-way MANOVA was conducted to determine if the context in which the injury occurred (attribution to self or other) affected athletes' mood states. The athlete's responses ( $n = 24$ ) to the Context B and Context C forms were categorized as either attributions to self ( $n = 9$ ) or other ( $n = 15$ ). Examples of attributions to self included "minor lack of concentration" and "slow reaction, out of position". Statements coded as attributions to other included "opposing lineman"; "opponent" and "the facilities - playing surface (turf), perhaps another players inability to make a block at that time". The Pillais test of significance was employed. Context was examined at the  $p = .05$  level.

The Psychological Responses to Injury Inventory (Evans & Hardy, 1996) was examined for internal consistency through Cronbach alpha coefficients. Pearson- Product Moment correlations between this inventory and the POMS (McNair, et al., 1981) were additionally completed.

## Results

### Reliability of the POMS Factors

Data on the Profile of Mood States (McNair, Lorr & Droppleman, 1981) was obtained from 269 Queen's University intercollegiate athletes. Items for each factor tension-anxiety (TEN), depression-dejection (DEP), anger-hostility (ANG), vigor-activity (VIG), fatigue-inertia (FAT) and confusion-bewilderment (CON) were examined for internal consistency. The standardized alpha coefficients ranged from .79 to .90 demonstrating high internal reliability. Table 1 presents internal consistency coefficients for each POMS factor.

Table 1

### Internal Consistency Reliabilities ( $\alpha$ ) for the Six POMS Factors

Factor	Items	$\alpha$
TEN	9	0.86
DEP	15	0.9
ANG	12	0.87
VIG	8	0.83
FAT	7	0.89
CON	7	0.79

Note. N = 269.

### POMS Baseline Comparisons

Prior to analysis, POMS data were examined through SPSS 7.0 for Windows for accuracy of data entry, missing values, and fit between the distribution and the assumptions of multivariate analysis. Only the POMS data for five of the six factor scores in the non-injured athlete group ( $n = 239$ ) at baseline were skewed. Various transformations were applied to each factor, the transformation which allowed normality to be achieved was subsequently employed. VIG was squared, and square root transformations were applied to the ANG, CON, DEP, and TEN sub-scales. FAT was not skewed and remained the same. Independent  $t$  - tests were conducted with injured and non- injured athletes at baseline. The results of the independent  $t$  - tests were not different from the raw data (Appendix C), therefore the raw data will be discussed.

To ascertain whether differences existed within the present sample of athletes ( $N = 269$ ), independent  $t$  - tests were conducted to compare mean scores of the injured ( $n = 30$ ) and non-injured group ( $n = 239$ ) at baseline. The only significant difference which emerged was Fatigue  $t(267) = - 2.38, p = .018$ . Once the Bonferroni correction  $.008 (.05/6)$  was employed, Fatigue was no longer significant.

Varsity athletes POMS data were compared to published college norms (McNair et al., 1981) in order to illustrate differential pre- to post-injury profiles. Male athletes' pre-injury mean scores were comparable to college normative data (McNair et al., 1981) on Tension, Anger and Confusion sub-scales. Vigor  $t(509) = 5.13, p < .001$ , and Fatigue  $t(509) = 5.46, p < .001$  were significantly higher among male athletes. Depression  $t(509) = 2.97, p < .01$  was lower, but only tended towards significance. Among females, Vigor  $t(612) =$

5.12,  $p < .001$ , was significantly higher for athletes, while Depression  $t(612) = 5.36$ ,  $p < .001$ , and Confusion  $t(612) = 5.20$ ,  $p < .001$  were significantly lower. Tension  $t(612) = 2.88$ ,  $p < .01$ , Anger  $t(612) = 2.10$ ,  $p < .05$ , and Fatigue  $t(612) = 2.06$ ,  $p < .05$  were notably lower, but only tended towards significance following the Bonferroni correction. Mean scores and standard deviations for the injured and non-injured athletes at baseline and college normative data on all six sub-scales are presented in Table 2.

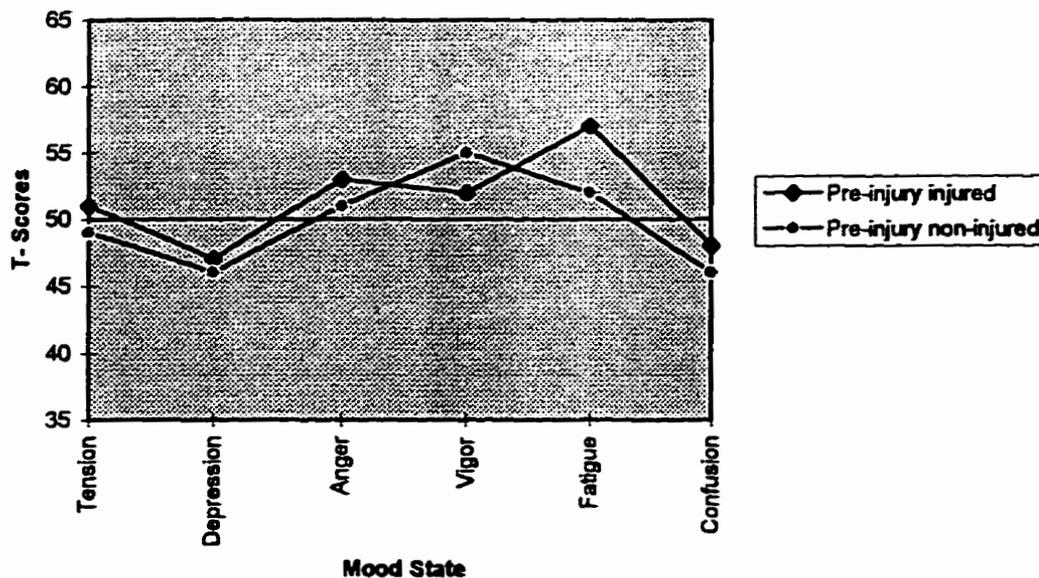
Baseline POMS scores for both injured and non-injured athletes were converted to Standard T Scores (McNair et al., 1981). Figure 5 illustrates the athletes' profiles in comparison to college norms.

Table 2

POMS Mean Scores (SD) for College Norms and Injured and Non injured Athletes at Baseline, Stratified by Gender

Factor	College Norms M (n = 340)	College Norms F (n = 516)	Total Sample M (n = 171)	Total Sample F (n = 98)	Injured Athletes M (n = 18)	Injured Athletes F (n = 12)	Non-injured Athletes M (n = 153)	Non-injured Athletes F (n = 86)
TEN	12.9	13.9	13.8	11.6	14.4	12.5	13.7	11.4
	-6.8	-7.4	-6.5	-6.3	-5.4	-4.5	-6.6	-6.5
DEP	13.1	14.8	10.3	8.4	10.2	11.4	10.3	8
	-10.5	-11.4	-9	-7	-10.2	-8.5	-8.9	-7.8
ANG	10.1	9.3	11.1	7.6	13.2	10.8	10.8	7.2
	-7.8	-7.4	-7.5	-7	-9.2	-11	-7.3	-6.2
VIG	15.6	15.6	18.4	19.2	17.5	17.1	18.5	19.5
	-6	-6.6	-5.4	-5	-6.5	-4.2	-5.3	-5.11
FAT	10.4	10.7	13.6	9.2	16.9	11	13.2	8.9
	-6.2	-6.8	-6.3	-5.4	-6.9	-4.4	-6.1	-5.5
CON	10.2	11.7	9.3	8.5	9.7	9.3	9.3	8.4
	-5.2	-5.7	-5	-4.8	-5.2	-3.6	-5	-4.9

Note. College norms published in McNair, Lorr and Droppleman (1981).



**Figure 5.** Pre-Injury Profiles of Total Sample Compared to College Standardized Scores. Pre-injury, non-injured  $n = 239$ ; Pre-injury, injured  $n = 30$ .

### Gender Differences

Multivariate analysis of variance was conducted to analyze for differences between males ( $n = 18$ ) and females ( $n = 12$ ) within the injured athlete group ( $n = 30$ ). A one-way MANOVA compared males and females on six dependent measures (TEN, DEP, ANG, VIG, FAT, & CON). Significant differences were not obtained  $F(6, 23) = 1.014, p = .441$ . Therefore gender differences were not explored in subsequent analyses.

### Evaluation of Hypothesis 1 a

In order to determine whether athletes ( $n = 30$ ) experienced a change in mood state following injury, paired t-tests were conducted to compare the means of six POMS subscales, pre- and post-injury. With the Bonferroni correction,  $p$  values less than  $0.0083$  ( $0.05/6$ ) were considered statistically significant. Decreases in vigor remained significant,  $t(29) = 4.77$ ,  $p < .000$  at the stringent alpha level, however, increases in depression  $t(29) = -2.42$ ,  $p = .022$  and decreases in fatigue  $t(29) = 2.26$ ,  $p = .032$  only approached significance after this correction (see Table 3).

### Evaluation of Hypothesis 1 b

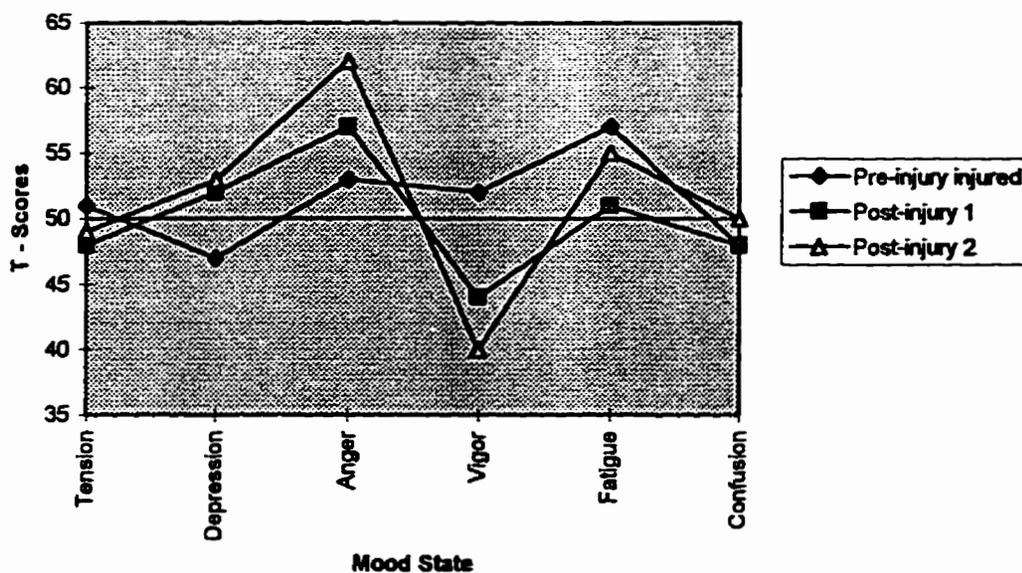
In order to determine whether mood changes occurred over the period of adjustment, POMS data of moderately and severely injured athletes ( $n = 7$ ) were evaluated pre-injury, immediately post-injury and one week post-injury. Repeated measures ANOVA revealed significant decreases in vigor  $F(2, 12) = 7.78$ ,  $p = .007$  over time, while depression approached significance  $F(2, 12) = 3.06$ ,  $p = .084$  (see Appendix C). A repeated measures MANOVA was not employed because the cell size ( $n = 7$ ) was not adequate for the number of dependent variables (6) being assessed (see Figure 6).

Table 3

Profile of Mood States Mean Scores Pre- and Post- Injury

Sub-scale	Pre-Injury M (SD)	Post-Injury M (SD)	p
TEN	13.63 (5.0)	12.0 (6.9)	.193
DEP	10.67 (9.4)	16.07 (12.6)	.022
ANG	12.23 (9.9)	15.00 (10.1)	.128
VIG	17.33 (5.6)	11.63 (7.2)	.000*
FAT	14.53 (6.6)	11.30 (6.9)	.032
CON	9.50 (4.5)	9.53 (4.3)	.970

Note. n = 30 \* p < .0083 (2 - tailed)



**Figure 6.** Profiles of Injured Athletes Pre and Post-Injury. Post-injury 1  $n = 30$ ; Post-injury 2  $n = 7$ .

### Evaluation of Hypothesis 2

Independent t-tests were employed to ascertain whether differences in self-esteem were evident between the injured ( $n = 29$ ) ( $M = .97$ ,  $SD = .19$ ) and non-injured groups ( $n = 220$ ) ( $M = 1.00$ ,  $SD = .18$ ) pre-injury. Differences were not observed  $t = .844$  (249),  $p = .399$ . Self-esteem did not change within the injured group pre-injury ( $n = 26$ ) ( $M = .96$ ,  $SD = .20$ ), post-injury ( $n = 26$ ) ( $M = .96$ ,  $SD = .20$ ) and one week following injury ( $n = 6$ ) ( $M = .50$ ,  $SD = .55$ ),  $t = 2.24$  (5),  $p = .076$ .  $T$  values could not be calculated for injured athletes pre-to post-injury, since the standard error of the difference was zero. Therefore, self-esteem was eliminated as a dependent variable to improve the power of the other statistical analyses (see Table 4).

Table 4

Means and Standard Deviations (SD) of Self-Esteem of Injured Athletes

Self - Esteem	Mean	SD	t	p
Pre-injury	.96	.20	*	*
Post-injury 1	.96	.20	*	*
Post-injury 2	.5	.55	2.24	.076

Note. Pre-injury  $n = 26$ ; Post-injury 1  $n = 26$ ; Post-injury 2  $n = 6$ .

\* t cannot be computed because the standard error of the difference is 0.

Evaluation of Hypothesis 3

A one-way MANOVA was conducted to determine if the context in which the injury occurred (attribution to self or other) affected athletes' ( $n = 24$ ) mood states. Utilizing the Pillais test of significance, self/other attributions were compared across the six POMS scales. Significant results did not emerge  $F(6, 17), = 1.765, p = .167$  (See Appendix C).

The Psychological Responses to Injury Inventory (Evans & Hardy, 1996)

With the exception of Reorganization, Cronbach alphas illustrated acceptable internal consistency ranging from .69 to .86 (see Table 5).

Table 5

Internal Consistency of the Psychological Responses to Injury Inventory

Sub-scale	Items	Evans & Hardy	
		<u>N</u> = 22	<u>N</u> = 20
Devastation	5	.85	.71
Dispirited	5	.78	.69
Reorganization	5	.75	-.51
Rationalization	5	.77	.80
Isolation	5	.87	.86

Note. Evans & Hardy (1996)

Means and standard deviations appear comparable to the results reported by Evans and Hardy (1996) on all sub-scales. Descriptive statistics for the five sub-scales are presented in Table 6.

Table 6

Means and Standard Deviations of the Psychological Responses to Injury Inventory

Sub-scale	Evans & Hardy (N = 22) M (SD)	Post-Injury 1 (n = 20) M (SD)	Post-Injury 2 (n = 6) M (SD)
Devastation	10.57 (2.84)	9.05 (3.3)	13.33 (6.31)
Dispirited	10.21 (3.38)	9.80 (3.02)	14.00 (2.90)
Reorganization	14.93 (2.92)	16.15 (2.23)	14.83 (1.83)
Rationalization	9.07 (9.5)	11.65 (4.65)	15.00 (5.76)
Isolation	9.50 (3.61)	9.30 (4.16)	13.67 (4.16)

Note. Evans and Hardy (1996).

Correlations Between The POMS and The Psychological Responses to Injury Inventory

The Profile of Mood States and the Psychological Responses to Injury Inventory are conceptually related. Pearson correlations were employed to assess the degree of association between sub-scales. Anger and Attempts to Rationalize  $r = .507$ ,  $p = .023$  and Vigor and Reorganization  $r = .527$ ,  $p = .017$  were found to be moderately associated (see Appendix C).

### Qualitative Analyses

Two athletes qualified for the interview portion of this investigation. Subject A participated in a relatively short season sport and suffered a season-ending injury. Subject B participated in a sport that spanned both fall and winter seasons. He became injured very early in the season and was able to return to his sport. The athletes responded differently in several respects to questions derived from The Emotional Responses of Athletes to Injury Questionnaire (Smith et al., 1990b). Subject A was openly distressed about her injury and rated its significance as more severe than Subject B. Subject A indicated that her perception of self as an athlete had changed since she had been unable to participate in her sport. Subject A reported feeling guilty about letting the team down, while the Subject B expressed frustration with non-participation. Further, timing of injury relative to academic demands and the probability of returning to sport within the season, were cited as important mediating factors in the emotional impact of their injuries. Perceptions of difficulty with personal and academic tasks, fear of re-injury, and availability of social support were other factors that elicited disparate responses.

### Summary of Results

Athletes in this investigation differed significantly from published college normative data (McNair et al., 1981). For males, the athlete group showed increased vigor, and fatigue compared to college norms at baseline, while female athletes displayed increased vigor and decreased depression and confusion. Differences were not observed between the injured and non-injured athletes pre-injury, although fatigue approached significance.

Athletes' scores on the Rosenberg Self-Esteem Inventory indicated high levels of self-esteem. Self-esteem did not change as a consequence of becoming injured nor as a result of non-participation one week following injury. There were no observable differences between the mood states of male and female athletes in the injured group.

Athletes experienced changes in mood state upon becoming injured as hypothesized. Vigor decreased significantly immediately following injury, a decline that became more precipitous one week following the injury occurrence. Increases in depression and decreases in fatigue were also notable but only approached statistical significance. Depression also tended towards significance one week subsequent to injury occurrence. The context in which the injury occurred was not shown to impact on mood states elicited.

Descriptive analyses and reliability measures of The Psychological Responses to Injury Inventory (Evans & Hardy, 1996) of injured athletes in this investigation were found to be comparable to results reported by Evans & Hardy (1996). Two scales of the Psychological Responses to Injury Inventory and the Profile of Mood States were found to be moderately associated.

## Discussion

### Contextual Parameters of this Investigation

An explanation of the context in which this data was collected is intended to provide a framework for interpretation of the results above. The experiences of Queen's varsity athletes are dissimilar in many respects to student-athletes at other universities where past studies have been conducted. These inherent differences are relevant to the interpretation of data collected in this study, as context influences cognitive appraisal.

This study was conducted at a medium-sized Canadian university, prominent for academic excellence. The primacy of academics within the university is present within the athletic domain.

While Queen's considers the experience of high level competition in interuniversity athletics an important facet of the total educational experience, the emphasis is always on the *student* in the context of the student-athlete. (Queen's Interuniversity Athletics, 1996)

This contention is supported by the recruiting methods of varsity teams, whereby academic performance is the foremost determinant of entrance to Queen's and scholarships are not offered on the basis of athletic ability. Queen's also provides the largest varsity athletics program in Canada. The existence of a large spectrum of sports and participants in this middle sized university may cause a diminution of "varsity status" on campus as compared to other universities. Queen's athletes do not enjoy the same social prominence as athletes who play for other universities. It is thus conceivable that Queen's athletes may not have the same emotional investment in sport or suffer the same psychosocial losses as athletes enrolled

at other institutions, especially American universities.

In contrast, athletes attending American universities have significant investment in their sport. Most athletes receive athletic scholarships, many have professional sport aspirations and compete in environments where they receive media attention. Competition is fierce both on and off the playing surface. When athletes become injured, even for short durations, they risk their playing status and potential opportunities to be scouted. Athletes at these universities receive considerable attention and notoriety (Etzel & Ferrante, 1993). For them, sport participation is a fundamental component of personal identity and may be instrumental in validation of self-worth (Parham, 1993). The preponderance of data to date has been conducted on such athletes. Therefore, the context in which this study was conducted must be considered when making comparisons to past literature. In addition, of the 269 participants in this investigation, only 30 athletes incurred injuries, therefore the small sample merits caution in interpretation of results.

### The Iceberg Profile

Athletes have tended to show more positive mood profiles than non-athletic populations (Terry, 1995). The iceberg profile describes a unique pattern of POMS standardized scores characteristic to successful athletes (Morgan, 1980). Specifically, the iceberg profile consists of increased vigor and decreased tension, depression, anger, fatigue and confusion comparative to normative standardized scores. In the present sample, male athletes exhibited greater vigor and fatigue in comparison with the college normative data. Vigor-activity is an aggregate score representing positive affect. Considering the extensive number of hours varsity athletes spend training, it is conceivable that athletes perceive

themselves to have higher energy levels than less active university students. Terry (1995) affirms that physical activity is a powerful moderating variable, which typically influences differential mood profiles among active and non-active populations. Divergent from the iceberg profile, male athletes in this study exhibited greater fatigue than college norms. It is possible that fatigue scores were elevated as a function of the time at which athletes completed the questionnaires. Since pre-injury forms were administered at the coaches' convenience, some athletes completed the forms immediately following a rigorous practice during intense pre-season training. Similarly, Smith et al. (1993) attributed elevated pre-injury fatigue in their sample to intense training and stress from pre-injury tryouts. Depression, anger and tension were not shown to be statistically different.

Consistent with the iceberg profile, female athletes demonstrated increased vigor and decreased depression and confusion in comparison to college norms. Increased vigor was expected as above. Depression-dejection has been described by McNair et al. (1981) as a sense of personal inadequacy and futility. Since this sample of athletes has been shown to possess high levels of self-esteem, and self-esteem is a composite assessment of self-worth (Fleming & Courtney, 1984), it is reasonable that these athletes appraised themselves to be less depressed. Confusion-bewilderment is considered a self-report of cognitive efficiency. Student-athletes may have perceived themselves as more focused or efficient considering the organizational abilities that are required to manage both academics and athletics. At the university where data was collected, "Many athletes say the outlet provided through sport is exactly what they needed to stay focused on their academic tasks." (Queen's University Athletics, 1996). Fatigue, anger, and tension were lower in female athletes but were not

shown to be significantly different.

### Pre-Injury Mood State

With the exception of fatigue, mood state differences were not apparent within the athlete sample. Although significance was only approached, injured athletes reported greater fatigue scores than non-injured athletes at baseline. In an investigation of the psychological factors related to the occurrence of athletic injuries, Kerr and Minden (1988) postulated that physical fatigue rendered athletes susceptible to injury. The finding that athletes who eventually became injured reported elevated fatigue pre-injury suggests a possible predisposition to injury and merits future exploration. Non-injured athletes approximated the iceberg profile more clearly than athletes who eventually became injured (see Figure 5).

### Self-Esteem

Varsity athletes possessed high self-esteem. This finding was anticipated since athletes are typically depicted as emotionally healthy (Crossman, 1985; Morgan, 1980). In this investigation, self-esteem remained unchanged immediately following injury and one week post-adjustment. This finding is consistent with Smith et al. (1993) who reported that self-esteem remained stable in competitive athletes immediately following the injurious episode. These results contradict the findings of Leddy et al. (1994) who found injured athletes experienced a decrease in self-esteem immediately following injury and McGowan et al. (1990) who discovered that athletes suffered a diminution of affect and feelings of self-worth within the first week following injury. Chan and Grossman (1988) have also reported prevented runners to experience a significant decrease in self-esteem over a four week period. These conflicting findings may be understood upon examination of the nature of the injuries

the athletes endured and the context in which the data was collected.

In the present investigation, 26 of 28 athletes encountered minor or moderate injuries (3 - 7 days non-participation), and in Smith et al.'s (1993) study, 27 of 36 athletes experienced minor or moderate injuries (non-participation for one or two weeks). In situations where athletes endured only mild impairment and short-term activity restriction, it is unlikely that injury for these athletes would have effected emotional, social, or physical self-components of self-esteem.

In Leddy et al.'s (1994) study, male collegiate athletes who participated in various sports reported diminished self-esteem immediately following injury and two months later in comparison with matched controls. Unfortunately the researchers were vague in detailing the severity of injuries experienced, therefore making comparisons problematic. Nevertheless, this investigation was conducted at a large, private NCAA Division IA university noted by the authors as maintaining a "competitive and successful athletic program"(p. 249), therefore the costs associated with becoming injured within this context may be interpreted as greater for these athletes as compared to the present sample of athletes.

In the investigation by McGowan et al., (1994) injured college football players from a prominent American university were restricted from sport participation up to ten weeks. Although only 2 of 16 athletes were out for the full ten week period, self-concept scores declined significantly the first week of non-participation for all 16 athletes and did not change significantly for a 3 week period ( $n = 8$ ). This finding may be attributed to greater uncertainty among players with respect to their anticipated return to sport and the impact their injuries may have on their playing status. This explanation is supported by McGowan et al.'s finding

that acute reductions in self-concept occurred when the team won. Follow-up interviews confirmed that the team's success in the absence of the injured player contributed to a decreased sense of self-worth.

Chan and Grossman's (1988) prevented runners were restricted from running for four weeks. Although their injuries may not be considered severe in nature, the amount of time that these athletes were prevented from running was significantly greater. Chan and Grossman speculated that for devoted athletes, restriction from the psychological benefits associated with running adversely affected their psychological well-being. These equivocal results suggest that it is not the injury itself but the interpretation of the injury as a threat to status or participation that influences self-esteem.

The permanence of elevated self-esteem exhibited by athletes in this investigation may also be explained by the fact that self-worth is a multifaceted self-assessment, in which facets are weighted differentially. In this sample, athletic identity is likely to be weighted to a lesser degree than for athletes who compete in American university environments (Brewer, Van Raalte, & Linder, 1993). According to Rosenberg (1979) self-esteem is based on "self-assessments that count" (p. 536). Similarly, Eldridge (1983) maintains that adapting to injuries is especially arduous for individuals with narrow self-concepts and whom perceive failure in other life tasks. Since academic self-concept is considered an integral part of self-esteem (Fleming & Courtney, 1984), and the present sample of athletes compete in an environment in which scholastic achievement is emphasized, it is feasible that academic performance could take precedence in the preservation of self-esteem for this sample.

However, the possibility that athletic identity may be an integral aspect of self-esteem

for some athletes, must not be discounted. The severely injured athlete who was interviewed (Subject A) was deeply distressed about her season-ending injury. The subject defined an athlete as "a person who gives all; who strives to be the best they can be no matter what level". However, when asked if she would describe herself as an athlete, she replied "I don't know; not since my injury". This subject was unmistakably distressed when speaking about her altered self-perception apparently deduced following a one month absence from sport participation.

#### Post-Injury Mood State

Athletes experienced a change in affect immediately following injury which ensued one week later. Specifically, vigor decreased significantly indicating a lack of energy, alertness, and activity. In accordance with past research (Weiss & Troxel, 1986; Chan & Grossman, 1988; Smith et al., 1990a) activity restriction was commonly cited by athletes as a contributing source of emotional distress (Appendix B). Activity deprivation is hypothesized to cause emotional disturbance through a loss of the psychological benefits provided by exercise. Regular physical exercise positively affects mood, anxiety, depression and tension; fosters feelings of personal control and efficacy; and buffers the negative effects of stress (Taylor, 1990). Varsity athletes devote a significant amount of time to physical conditioning. Subject A reported training 3 hours per day in addition to competing on weekends. Deutsch (1985) contends

An injury that even temporarily halts participation causes a tear in the fabric of well-being through which uncomfortable or unacceptable feelings may emerge. A change in daily routine is a stressful event, especially when the lost activity is greatly valued. (p.233)

Psychological distress resulting from the abrupt removal of this important contributor to well-being and controller of stress is understandable in this context. The results from this investigation would suggest that even short-term activity deprivation associated with an injury can be detrimental for many athletes. Research consistently supports a precipitous decline in vigor among injured recreational athletes (Chan & Grossman, 1988; Pearson & Jones, 1992; & Smith et al., 1990a), competitive athletes (Smith et al., 1993), and intercollegiate athletes (McDonald & Hardy, 1990).

Depression- dejection describes feelings of personal worthlessness, sadness, guilt, and a sense of emotional isolation (McNair et al., 1981). Although, depression only approached significance both immediately following the injury and one week later, it has been found to be intensely experienced by injured athletes in past research (Chan & Grossman, 1988; Leddy et al., 1994; McDonald & Hardy, 1990; Pearson & Jones, 1992; Smith et al., 1990a; Smith et al., 1993; Uemukai, 1993). Furthermore, large standard deviations in the present study illustrate considerable individual differences in the magnitude to which depression was experienced. For some athletes, a mild-moderate injury may be perceived as a relief from the stress of excelling in both academic and athletic domains and may allow for valued leisure time to socialize with classmates and catch up on academic work. Time-management and social isolation are commonly experienced challenges of student-athletes (Parham, 1993).

Other injured athletes may experience intense dejection and isolation. The experience of injury may have a differential impact on athletes depending upon their playing status and the depth of players available to take their place. Some athletes may fear replacement and feel dejected. Leddy et al. (1994) discovered that some athletes experienced depression in clinical

proportions. The magnitude of responses illustrates the importance of considering athletes' emotional reactions individually. Depression is a mood disturbance in which athletes have been shown to be especially vulnerable. Past research has shown that athletes tend to experience depression more intensely and suffer for greater durations than non-athletes (Morgan, 1980). In the context of sport injuries, depression must also be swiftly detected to combat its debilitating influence on adherence to rehabilitation (Daly et al., 1995). The finding that depression did approach significance considering the small sample size and predominance of minor injuries, demonstrates the importance of exploring the meaningfulness of sport participation and injury to each individual athlete. It is possible that for some athletes, depression was intensely experienced.

Fatigue - Inertia describes feelings of weariness, listlessness, and exhaustion. Fatigue was shown to approach significance immediately following injury and notably one week later. Although fatigue scores appeared to be high following injury, they were actually less than pre-injury measures. Elevated pre-season values have been previously explained by intense pre-season training. The finding that fatigue remained above the 50<sup>th</sup> T-Score, may be an artifact of training at the time of the initial data collection. Lower fatigue values post-injury 1 and 2 may be explained by the fact that data was collected at a time of rest and recuperation. Smith et al. (1993) reported similar results.

Anger - Hostility denotes feelings of intense, overt anger, resentment and annoyance. Anger did not achieve significance in this present study. However, similar to the findings of Pearson and Jones (1992), athletes expressed frustration from the disruptions injuries imposed on their lives. Perhaps, the mild frustration and disruption that athletes as a group

experienced, were insufficient to cause significant disturbance as a group. However, large standard deviations also observed within this sub-scale would imply that for some athletes, anger was present. In contrast to these results, significant increases in anger have been documented in previous research (Chan & Grossman, 1988; McDonald & Hardy, 1990; Pearson & Jones, 1992; Smith et al., 1990a; Smith et al., 1993; Uemukai, 1993).

Tension - anxiety was not found to change as a result of injury occurrence. Tension describes a sense of anxiousness and panic manifested in a heightened musculoskeletal physiological response (McNair et al., 1981). This finding is in contrast to past research (Chan & Grossman, 1988; Pearson & Jones, 1992; Smith et al., 1990a; & Smith et al., 1993) and may be explained through consideration of the experiences of severely injured athletes who compete for American colleges where the consequences of becoming injured are significantly different. As stated previously, the athletic populations in this study are not representative of the athletes investigated by previous researchers. It is possible that these athletes did not perceive their injuries as a significant threat, therefore the situation was not appraised as anxiety provoking and thus tension was not experienced.

Confusion- bewilderment is considered a by-product of anxiety or related states (McNair et al., 1981). As stated above, since anxiety may not have been experienced, it is possible that confusion then too was absent. In contrast, Etzel and Ferrante (1993) have stated that the experience of injury evokes an "overwhelming sense of confusion and numbness" (p.273) among some athletes. The pattern of minimal emotional disturbance implies that, instead of suffering an emotional upheaval, the majority of athletes in this investigation may have taken their injury in stride and may have appraised their injury as an

opportunity to focus on school-related tasks.

### Attribution of Cause of Injury

Preoccupation with culpability for injury, an attribution to either self or other, is believed to contribute to problems in psychological adjustment (Heil, 1993). Heil contends that if the athlete assumes responsibility for the injury, he/she is more apt to experience intense guilt and interpret the injury as a personal failure. Individual sport athletes may experience guilt with respect to disappointing family members and the loss of time and financial investments spent on training and coaching. Team sport participants may additionally feel like they have let their teammates down. Anger is hypothesized to be elicited if the athlete places the blame for the injury on someone else (Heil). Athletes in these circumstances experience additional aggravation and feel cheated. Furthermore, athletes are believed to be more likely disturbed if the injury was intentionally caused (Heil). Wiese and Weiss (1987) have also suggested that the perceived context of the injurious situation (cheap shot versus accidental collision) may influence an athlete's reaction to injury. The present investigation is the first to date to attempt to empirically test this hypothesized association. Athletes were asked to describe the factors they felt contributed to their injury. Athletes responses were subsequently coded as attributions to either self or other and then analyzed with respect to the mood states elicited. Attributions to self included "minor lack of concentration" and "slow reaction, out of position". Statements coded as attribution to other included "opposing lineman"; "opponent"; and "the facilities - playing surface (turf), perhaps another players ability to make a block at that time". The context in which the injury occurred did not seem to affect the athletes emotional responses to injury in this investigation.

It may in fact be that attributions of injury may not differentially effect mood states. It may also be possible that the nature of the injuries encountered were not traumatic enough to cause a detectable change in affect. The interaction of severity of injuries and attribution may be an area for further research. Moreover, perhaps guilt is the emotion of question and although the sub-scale depression is incorporates "guilt and sorry for things done" (McNair et al., 1981) the instrument employed (POMS) was perhaps insensitive to measuring guilt as an isolated construct.

#### Psychological Responses to Injury Inventory

The Psychological Responses to Injury Inventory was developed by Evans and Hardy (1996) to provide a sport specific affectivity measure for the assessment of injured athletes. The results of this investigation indicate that this questionnaire has acceptable psychometric integrity. Specifically, with the exception of 'Reorganization', items on all scales showed acceptable internal consistency. The instrument is comprised of five theoretically derived sub-scales. Evans and Hardy supported the theoretical basis of each scale with previous research: 'Devastation' reflects feelings of frustration, shock, and emptiness (McDonald & Hardy, 1990). 'Dispirited' consists of feelings of apathy, loss of motivation, (McDonald & Hardy); frustration (Pearson & Jones, 1992); depression (Chan & Grossman, 1988; McDonald & Hardy; Pearson & Jones; Smith et al., 1990a; Smith et al., 1993) and denial. 'Reorganization' is comprised of feelings of physical and psychological reorganization. 'Attempts to Rationalize' (McDonald & Hardy) reflects a search for meaning. Finally, 'Isolation' has social connotations of anxiety, guilt and hostility (Pearson & Jones). Evans and Hardy reported the results of their analysis with respect to changes in affect over time. The imprecision of injury

definitions (Less Severely Injured Group = injured for “a period less than three weeks” and Severely Injured Group = injured for “a period greater than three weeks”) (p.15) and frequency of data collection (median values of early, middle and late collection dates) thwarts comparisons to present data. Evans and Hardy found significant decreases in ‘Devastation’ and ‘Isolation’ from early to late phases and significant increases in reorganization for early to late and mid to late phases of the injury period. Consistent with previous literature (McDonald & Hardy; Quackenbush & Crossman, 1994; Smith et al., 1990a) the pattern of responses supported a progression of mean scores from negative towards more positive responses across time. In an attempt to make some meaningful comparisons, the present data will be discussed with respect to Evans and Hardy's data for the “Early Less Severe Injury Group”. Mean scores across all factor scales exhibited comparable values. ‘Devastation’, ‘Dispirited’ and ‘Isolation’ scores tended to be similarly expressed while ‘Reorganization’ and ‘Rationalization’ scores were comparatively elevated. In contrast to McDonald and Hardy's findings, negative mood states appeared to increase one week following adjustment. The results of this study suggests that negative affect may rise sharply prior to the onset of positive affect, an effect that was not detected as a result of data collection methods employed by Evans and Hardy. It is possible that a rise in negative affect one week following the injury episode results from a full realization of the severity of injury and the implications associated with restricted participation. Moreover, increased negative affect may be explained by an athlete's progression out of the protective stage of denial.

The Psychological Responses to Injury Inventory is conceptually related to The Profile of Mood States. ‘Anger’ and ‘Attempts to Rationalize’ were shown to be moderately

associated. The 'Anger' factor encompasses resentment, hostility and bitterness. 'Attempts to Rationalize' is supposed to relate to "a search for meaning" (Evans & Hardy, 1996), however, the items that comprise the scale include statements such as "I feel cheated" and "I can't help but feel bitter" resembling resentment to a greater degree. 'Vigor' and 'Reorganization' were also moderately related. This association is foreseeable considering that both sub-scales represent positive affect. The lack of association between the other sub-scales suggests that this inventory may be assessing different emotional components specific to the experiences of injured athletes. Therefore, the Psychological Responses to Injury Inventory (Evans & Hardy) deserves future exploration as an effective sport specific instrument.

### Qualitative Analyses

The qualitative interviews illustrated how diversely athletes respond to injuries. It is not possible to make definitive or generalized statements on the bases of these two interviews. However, timing of injury relative to academic demands, the probability of returning to sport within the season, perceptions of difficulty with personal and academic tasks, fear of re-injury, and perceptions of social support were identified as relevant factors in the mediation of emotional responses. In the future, it seems prudent to assess the athletes' perceptions to fully comprehend the relationship between injury and emotional responses.

### Cognitive Appraisal Models

Wiese and Weiss, (1987) have stressed the importance of personal and situational factors in the appraisal of injury as a stressor. Athletes in this study reported high levels of self-esteem, possibly weighted less on athletic ability than academic achievement. Self-esteem may have been an important contributing personal factor in the muting of threatening appraisal of injuries. Similarly situational factors relating to the nature and extent of the injuries experienced, in combination with the environment in which these athletes participate in sport has been explained to be more accommodating to becoming injured than other sampled university environments. Even in the context in which the athlete role has less prestige and rewards, mood disturbance was observed. The changes observed in mood states and the relatively large standard deviations support the contention that it is the individual athlete's perception of the impact of the injury that is the causative agent for mood disturbance. Cognitive appraisal processes facilitate the explanation of diverse responses to similar circumstances. These findings illustrate the importance of exploring the assigned meaning the athlete ascribes to his/her sport involvement and the perceived consequences of injury. As Deutsch (1985) affirms, even minor injuries can be perceived as threatening if the injury has symbolic meaning and endangers future involvement. The interpretive element of cognitive appraisal processes is instrumental in the mediation of thoughts, feelings and actions, and thus necessitates examination by future researchers.

### Practical Implications

The results of this investigation highlight the importance of understanding loss as defined by the athlete. In a context in which varsity sport is not high profile and the injuries experienced were mild to moderate in nature, a negative emotional response was observed. Since emotional disturbances have been shown to interfere with adherence to rehabilitation programs (Daly et al., 1995), health-care professionals associated with the physical recovery process must be cognizant of the psychological implications of athletic injuries. Athletes' perceptions of their injuries must not be discounted. The amount of emotional disruption experienced cannot be underestimated (Crossman & Jamieson, 1985), and an understanding of the loss experienced must be conveyed to the athlete (Lynch, 1988). It is important that these health-care professionals receive training in the recognition of athletes who may be at risk in psychological adjustment and have resources available for referral.

### Limitations

Several issues related to research design merit discussion. First, a number of athletes were missed due to the necessity of having trainers select athletes who they believed would be out of participation for at least three days. Often, athletes ended up missing more days than expected and since they hadn't filled out a questionnaire within the initial 48 hour period, these subjects were not included. Future studies should have all athletes that seek medical attention requiring cessation of activity, to fill out the questionnaires and be later omitted if they return to participation sooner than the three day period. Secondly, athletes were missed through refusal to complete the questionnaire package at the time of injury. This was unfortunate since these athletes may have experienced emotions at greater intensities that

others who did agree to fill out the form. However, participation was voluntary and thus this problem was anticipated to some degree.

An additional research design limitation involved the timing of the administration of the pre-season questionnaires. Data was collected at the convenience of the coaches. In situations where the questionnaires were administered before practice, subjects appeared hurried and agitated. When data was collected after practice, subjects were observed to be fatigued and uninterested. Future studies should be consistent with respect to collection of data either pre- or post- practice. Ideally, data should be collected apart from the training environment and should allow athletes as much time as needed.

The small sample size merits caution in the generalizability of these results to other athletic populations. However, the results support that even mild-moderate injuries do have a significant negative impact on vigor and possibly effect depression and fatigue in a context that does not elevate 'athlete status'. It is possible that with increased power, significance may also have been attained with depression and fatigue.

Although the Profile of Mood States questionnaire has been used extensively in sport psychology research (LeUnes et al., 1988), the implementation of the POMS instrument in the assessment of athletic populations has been challenged (Evans & Hardy, 1996; Terry, 1995). Specifically, the usefulness of comparing POMS data with psychiatric and college sample norms has been questioned. Terry (1995) is currently developing athlete norms, however problems with level of competition and differences among sports have made even athletic norms problematic.

### Future Directions

This study has identified the importance of assessing and understanding the role of perception in the interpretation of sport injuries. A continuation of recent research in the domain of cognitive appraisal (Daly et al., 1995; Brewer et al., 1995) is required in which greater attention is allotted to the effects of personal factors and situational determinants (Brewer, 1994) and interactional paradigms (McDonald & Hardy, 1990). Future consistency is required in terms of injury definition and corresponding degrees of severity. An emphasis on the athlete's perception of severity merits future investigation. Evans and Hardy (1995) have criticized several investigations (Leddy et al., 1994; Smith et al., 1990a; Smith et al., 1993) for employing imprecise definitions in order to increase sample size. They argue that investigation of injuries that prevent participation for one day are ineffectual in the advancement of our understanding of the psychological responses of injured athletes.

Future research must involve more frequent data collection over extended periods to more accurately measure fluctuations in affect. Collecting affect data at two-week intervals (McDonald & Hardy 1990; Smith et al., 1990a) or later (Leddy et al., 1994) does not adequately capture emotional oscillations. Furthermore, future investigators must address the distinct absence of qualitative data that may enhance the understanding of complex psychological processes (Rose & Jevne, 1993). Finally, future researchers must strive to create, employ, and validate population specific affectivity measures (Evans & Hardy, 1995) to more appropriately identify and assess the emotional responses experienced by injured athletes.

### Conclusion

Physical injuries pervade the lives of athletes and appear to be on the rise (Nideffer, 1989). This investigation elucidates the importance of understanding the role of perception in the interpretation of sport injuries. Athletes respond differently to physical injury. Some athletes take their injury in stride (Smith et al., 1990b), while others experience profound emotional disruption (Leddy et al., 1994) which may effect their ability to recover successfully. This investigation illustrates that even mild-moderate injuries cause emotional distress. As a result of this study, it is hypothesized that the meaningfulness of sport involvement ascribed by athletes, and the contextual parameters of participation are significant factors in the mediation of psychological responses. Health and sport-related practitioners must be astute in the recognition and management of athletes who require psychological care.

## References

- Andersen, M. B., & Williams, J. M. (1988). A model of stress and athletic injury: prediction and prevention. Journal of Sport and Exercise Psychology, 10, 294-306.
- Astle, S.J. (1986). The experience of loss in athletes. Journal of Sports Medicine and Physical Fitness, 26, 279-284.
- Brewer, B. W. (1994). Review and critique of models of psychological adjustment to athletic injury. Journal of Applied Sport Psychology, 6, 87-100.
- Brewer, B.W., Linder, D. E., & Phelps, C. M. (1995). Situational correlates of emotional adjustment to athletic injury. Journal of Sport Medicine, 5, (4), 241-245.
- Brewer, B.W., Van Raalte, J. L., & Linder, D.E. (1993). Athletic identity: Hercules' muscles or achilles heel? International Journal of Sport Psychology, 24, 237 - 254.
- Chan, C.S., & Grossman, H. Y. (1988). Psychological effects of running loss on consistent runners. Perceptual and Motor Skills, 66, 875 - 883.
- Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. Psychometrika, 16, 297-334.
- Crossman, J. (1985). Psychosocial factors and athletic injury. Journal of Sports Medicine and Physical Fitness, 25, 151-154.
- Crossman, J., & Jamieson, J. (1985). Differences in perceptions of seriousness and disrupting effects of athletic injury as viewed by athletes and their trainer. Perceptual and Motor Skills, 61, 1131-1134.

- Daly, J. M., Brewer, B. W., Van Raalte, J. L., Petitpas, A. J., & Sklar, J. H. (1995). Cognitive appraisal, emotional adjustment, and adherence to rehabilitation following knee surgery. Journal of Sport Rehabilitation, 4, 23-30.
- Deutsch, R.E. (1985). The psychological implications of sport related injuries. International Journal of Sport Psychology, 16, 232-237.
- Eldridge, W. D. (1983). The importance of psychotherapy for athletic-related orthopedic injuries among adults. Comprehensive Psychiatry, 24, 271 - 277.
- Etzel, E. F., & Ferrante, A. P. (1993). Providing psychological assistance to injured and disabled college student athletes. In D. Pargman (Ed.), Psychological bases of sport injuries (pp. 265-283). Morgantown, WV: Fitness Information Technology.
- Evans, L., & Hardy, L. (1995). Sport injury and grief responses: A review. Journal of Sport and Exercise Psychology, 17, 227-245.
- Evans, L., Hardy, L. & Mullen, R. (1996). The development of the psychological responses to injury inventory. Journal of Sport Sciences, 14, 27 - 28.
- Evans, L., & Hardy, L. (1996). The measurement of psychological responses to injury. Unpublished manuscript, University of Wales Institute at Cardiff and University of Wales at Bangor.
- Fleming, J. S., & Courtney, B. E. (1984). The dimensionality of self-esteem: Hierarchical facet model for revised measurement scales. The Journal of Personality and Social Psychology, 46 (2), 404-421.
- Gordon, S., & Lindgren, S. (1990). Psycho-physical rehabilitation from a serious sport injury: A case study of an elite fast bowler. The Australian Journal of Science and

Medicine in Sport, 22, 71-76.

Gordon, S., Milios, D., & Grove, R. J. (1991). Psychological aspects of the recovery process from sport injury: The perspective of sport physiotherapists. The Australian Journal of Science and Medicine in Sport, 23 (2), 53-60.

Heil, J. (1993). The psychology of sport injury. Champaign IL: Human Kinetics Publishers.

Hodge, K. P., & McNair, P. J. (1990). Psychological rehabilitation of sport injuries. New Zealand Journal of Sports Medicine, 18, (4), 64-67.

Kerr, G., & Minden, H. (1988). Psychological factors related to the occurrence of athletic injuries. Journal of Sport and Exercise Psychology, 1988, 10, 167-173.

Kleiber, D., Greendorfer, S., Blinde, E., & Samdahl (1987). Quality of exit from university sports and life satisfaction in early adulthood. Sociology of Sport Journal, 4, 28-36.

Kubler-Ross, E. (1969). On death and dying. London: Tavistock

Larson, G.A., Starkey, C., & Zaichowsky (1996). Psychological aspects of athletic injuries as perceived by athletic trainers. The Sport Psychologist, 10, 37-47.

Lazarus, R.S., & Folkman, S. (1984). Stress, appraisal and coping. New York: Springer.

Leddy, M. H., Lambert, M. J., & Ogles, B. M. (1994). Psychological consequences of athletic injury among high-level competitors. Research Quarterly for Exercise and Sport, 65, 347-354.

LeUnes, A., Hayward, S., & Daiss, S. (1988). Annotated bibliography on the

Profile of Mood States in Sport, 1975-1988. Journal of Sport Behavior, 11, (3), 213-240.

Lynch, G. P. (1988). Athletic injuries and the practicing sport psychologist: Practical guidelines for assisting athletes. The Sport Psychologist, 2, 161-167.

McDonald, S. A., & Hardy, D. J. (1990). Affective response patterns of the injured athlete: An exploratory analysis. The Sport Psychologist, 4, 261-274.

McGowan, R.W., Pierce, E. F., Williams, M., & Eastman, N. W. (1994). Athletic injury and self-diminution. The Journal of Sports Medicine and Physical Fitness, 34 (30), 299-304.

McNair, D. M., Lorr, M., & Droppleman, L. F. (1981). Manual for the Profile of Mood States. San Diego, CA: Educational and Industrial testing service.

Morgan, W. (1980) Test of champions. Psychology Today, July, 92-101.

Nideffer, R. M. (1989). Psychological aspects of sport injuries: issues in prevention and treatment. International Journal of Sport Psychology, 20, 241-255.

Parham, W. D. (1993). The intercollegiate athlete: A 1990's profile. The Counseling Psychologist, 21, (3), 411-429.

Pearson, L., & Jones, G. (1992). Emotional effects of sports injuries: Implications for physiotherapists. Physiotherapy, 78, 762-770.

Peretz, D. (1970). Development, object-relationships and loss. In B. Schoenberg, A.C. Carr, D. Peretz & A. H. Kutscher (Eds.), Loss and grief: Psychological management in medical practice (pp. 3-19). NY: Columbia University.

Petrie, T.A. (1993). The moderating effects of social support and playing status on the life stress-injury relationship. Journal of Applied Sport Psychology, 5, 1-16.

Quackenbush, N., & Crossman, J. (1994). Injured athletes: a study of emotional responses. Journal of Sport Behavior, 17, 178-187.

Queen's Interuniversity Athletics. (1996). Varsity Athletics Program Information (Brochure). Department of Athletics, Queen's University, Kingston, ON.

Rose, J., & Jevne, R. F. J. (1993). Psychosocial processes associated with athletic injuries. The Sport Psychologist, 7, 309-328.

Rosenberg, M. (1965). Society and the adolescent self image. Princeton, NJ: Princeton University Press.

Rosenberg, M. (1979). Conceiving the self. New York: Basic Books Inc.

Rotella, R. J., & Heyman, S. R. (1986). Stress, injury and the psychological rehabilitation of athletes. In J. M. Williams (Ed.), Applied sport psychology (pp.343-364). Palo Alto, CA: Mayfield.

Simos, B.G. (1977). Grief therapy to facilitate healthy restitution. Social Casework, 58, 337-342.

Smith, A.M., & Milliner, E.K. (1994). Injured athletes and risk of suicide. Journal of Athletic Training, 29, (4), 337-341.

Smith, A. M., Scott, S. G., O'Fallon, W. M., & Young, M. L. (1990a). Emotional responses to injury. Mayo Clinic Proceedings, 65, 38-50.

Smith, A. M., Scott, S. G., & Wiese, D. M. (1990b). The psychological effects of sports injuries: Coping. Sports Medicine, 9, 352-369.

Smith, A. M., Stuart, M. J., Wiese-Bjornstal, D. M., Milliner, E. K., O'Fallon, W. M., & Crowson, C. S. (1993). Competitive athletes: Pre-injury and post-injury mood

state and self-esteem. Mayo Clinic Proceedings, 68, 939-947.

Taylor, S.E. (1991). Health psychology. (2nd ed.). New York: McGraw-Hill, Inc.

Terry, P. (1995). The efficacy of mood state profiling with elite performers: A review and synthesis. The Sport Psychologist, 9, 309-325.

Uemukai, K. (1993). Affective responses and the changes in athletes due to injury. Proceedings of the Eighth World Sport Psychology Conference, Portugal (pp. 500-503). Lisbon: International Society of Sport Psychology.

Weiss, M. R., & Troxel, R. K. (1986). Psychology of the injured athlete. Athletic Training, 21, 104-110.

Weise, D. M., & Weiss, M. R. (1987). Psychological rehabilitation and physical injury: implications for the sports medicine team. The Sport Psychologist, 1, 318-330.

Wiese-Bjornstal, D. M., & Smith, A. M. (1993). Counseling strategies for enhanced recovery of injured athletes within a team approach. In D. Pargman (Ed.), Psychological bases of sport injuries (pp.149-183). Morgantown, WV: Fitness Information Technology.

Williams, J.M., & Roepke (1993). Psychology of injury and injury rehabilitation. In Singer, R.N., Murphey, M. & Tennant, K. L., (Eds.) Handbook of research on sport psychology (pp. 815-839). New York: Macmillan.

**Appendix A**

**Consent Form**

**Demographic information**

**Instructions to Athletes**

**Instructions to Trainers**

## CONSENT FORM

This study seeks to investigate the emotional responses and adjustments to sport injuries by intercollegiate athletes. In order to measure response effect, it is necessary to first obtain a measure in the non-injured state. All athletes in selected sports are being requested to complete this initial questionnaire. In the event that you become injured, you will be asked to complete additional questionnaires and may be requested to participate in individual interviews.

Your involvement is strictly confidential and all questionnaire data will be reported in group format. Participation is voluntary and you are free to withdraw at any time. This study will provide valuable information to researchers in sport psychology as well as, trainers, coaches and others who support athletes in their rehabilitation.

This study has passed an ethics review by the School of Physical and Health Education, Queen's University. If you have any questions regarding this study you may contact Niki Chute at 545-6000 ext.5355 or Dr. John Albinson at the School of Physical and Health Education, 545-6283. Further concerns may be directed to Dr. Joan Stevenson, Director of the School of Physical and Health Education, at 545-2666.

Your time and cooperation is greatly appreciated.

---

I have read the above statement and freely consent to participate in this research.

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

### DEMOGRAPHIC INFORMATION

Name : \_\_\_\_\_ Age : \_\_\_\_\_ Sex : \_\_\_\_\_

Faculty : \_\_\_\_\_ Year : \_\_\_\_\_

Sport : \_\_\_\_\_ Year of eligibility : \_\_\_\_\_

Years of participation in above sport : \_\_\_\_\_

Are you now or have you been in the last 12 months on a

Senior provincial    yes        no   

or

Senior national team    yes        no   

Please indicate the highest level to which you aspire :

Varsity                     

Senior provincial          

Senior national           

Other : \_\_\_\_\_

Have you had an injury which kept you out of participation in sport for :

1 - 2 weeks                yes        no   

3 weeks or more        yes        no

## INSTRUCTIONS TO ATHLETES

Good evening, I am a graduate student in the School of Physical and Health Education at Queen's. I am conducting a study on the emotional responses of athletes to sport injury for my Master's thesis. Previous research has shown that the emotional reactions of injured athletes impact on their subsequent rehabilitation. Information obtained in this study will be of value to trainers, coaches and others who will receive information on how to better manage an athlete's psychological recovery. I am requesting your assistance in my research.

As you can see from the consent form, all athletes of selected sports will be asked to fill out this initial questionnaire. In the event that you become injured, you will be asked to complete additional questionnaires and may be requested to participate in individual interviews.

Your involvement is strictly confidential and your participation is entirely voluntary. The consent form and demographic form will be detached and all questionnaires will be coded and treated as group data. Subsequent questionnaires will be placed in sealed envelopes and coded also.

I am happy to answer any questions that you may have concerning this study, or you may contact me at the number listed on the consent form. Please respond to the questions carefully and truthfully. Thank you very much for your time and assistance.

## INSTRUCTIONS TO TRAINERS

Study: **The Psychological Responses to Sport Injuries by Varsity Athletes**

Contact: Niki Chute, 545-6000 ext. 5355 or mail box in PHED office

### PROCEDURE

1. **Package A - Baseline data**
2. **Package B - For the purposes of this study, athletes expected to be **unable to participate in activity for at least 3 days or who will miss one game** will be asked to complete questionnaires in Package B. (i.e. 3 days of non-activity not necessarily 3 practice days).**
3. **You will be provided with these packages and asked to distribute them to athletes within 48 hours of their injury (recommendation: training room). They should take between 5 - 10 minutes.**
4. **Athletes will return these packages **sealed**. Please ensure they have written their name on the envelope.**
5. **Deposit this package in the **box** provided. I will pick up the envelopes frequently.**
6. **If you encounter a severe injury, that is and injury expected to keep the athlete from participating in his/her sport for at least 3 weeks, please contact me at the phone number above or leave a message in my box (located in the PHED office). I will contact these athletes personally and request an interview.**

**Thank you in advance for you assistance.**

**Appendix B**

**The Profile of Mood States Questionnaire**

**The Profile of Mood States Scoring Key**

**The Rosenberg Self-Esteem Scale**

**The Rosenberg Self-Esteem Scale Scoring Key**

**The Psychological Responses to Injury Inventory**

**The Psychological Responses to Injury Inventory Scoring Key**

**Context B Form**

**Context C Form**

**The Emotional Responses of Athletes to Injury Questionnaire**

### THE PROFILE OF MOOD STATES

Below is a list of words that describe feelings and moods people have. Please read EVERY WORD carefully. Then circle the ONE number under the answer to the right which best describes HOW YOU HAVE BEEN FEELING DURING THE PAST WEEK INCLUDING TODAY. Suppose the word is HAPPY. Circle the number which is closest to how you have been feeling DURING the PAST WEEK INCLUDING TODAY. The numbers refer to these phrases

*0 - Not at all like this*

*1 - A little like this*

*2 - Moderately like this*

*3 - Quite a bit like this*

*4 - Extremely like this*

	NOT AT ALL	A LITTLE	MOD- ERATELY	QUITE A BIT	EXTRE- MELY
1. Friendly	0	1	2	3	4
2. Tense	0	1	2	3	4
3. Angry	0	1	2	3	4
4. Worn out	0	1	2	3	4
5. Unhappy	0	1	2	3	4
6. Clear-headed	0	1	2	3	4
7. Lively	0	1	2	3	4
8. Confused	0	1	2	3	4
9. Sorry for things done	0	1	2	3	4
10. Shaky	0	1	2	3	4
11. Listless	0	1	2	3	4
12. Peeved	0	1	2	3	4
13. Considerate	0	1	2	3	4
14. Sad	0	1	2	3	4
15. Active	0	1	2	3	4
16. On edge	0	1	2	3	4
17. Grouchy	0	1	2	3	4

	NOT AT ALL	A LITTLE	MOD- ERATELY	QUITE A BIT	EXTRE- MELY
18. Blue	0	1	2	3	4
19. Energetic	0	1	2	3	4
20. Panicky	0	1	2	3	4
21. Hopeless	0	1	2	3	4
22. Relaxed	0	1	2	3	4
23. Unworthy	0	1	2	3	4
24. Spiteful	0	1	2	3	4
25. Sympathetic	0	1	2	3	4
26. Uneasy	0	1	2	3	4
27. Restless	0	1	2	3	4
28. Unable to concentrate	0	1	2	3	4
29. Fatigued	0	1	2	3	4
30. Helpful	0	1	2	3	4
31. Annoyed	0	1	2	3	4
32. Discouraged	0	1	2	3	4
33. Resentful	0	1	2	3	4
34. Nervous	0	1	2	3	4
35. Lonely	0	1	2	3	4
36. Miserable	0	1	2	3	4
37. Muddled	0	1	2	3	4
38. Cheerful	0	1	2	3	4
39. Bitter	0	1	2	3	4
40. Exhausted	0	1	2	3	4
41. Anxious	0	1	2	3	4
42. Ready to fight	0	1	2	3	4
43. Good natured	0	1	2	3	4
44. Gloomy	0	1	2	3	4
45. Desperate	0	1	2	3	4
46. Sluggish	0	1	2	3	4
47. Rebellious	0	1	2	3	4

	NOT AT ALL	A LITTLE	MOD- ERATELY	QUITE A BIT	EXTRE- MELY
48. Helpless	0	1	2	3	4
49. Weary	0	1	2	3	4
50. Bewildered	0	1	2	3	4
51. Alert	0	1	2	3	4
52. Deceived	0	1	2	3	4
53. Furious	0	1	2	3	4
54. Efficient	0	1	2	3	4
55. Trusting	0	1	2	3	4
56. Full of pep	0	1	2	3	4
57. Bad - tempered	0	1	2	3	4
58. Worthless	0	1	2	3	4
59. Forgetful	0	1	2	3	4
60. Carefree	0	1	2	3	4
61. Terrified	0	1	2	3	4
62. Guilty	0	1	2	3	4
63. Vigorous	0	1	2	3	4
64. Uncertain about things	0	1	2	3	4
65. Bushed	0	1	2	3	4

**PROFILE OF MOOD STATES****Instructions for Scoring:**

<b>Sub-scale</b>	<b>Items</b>
Tension	2, 10, 16, 20, (22), 26, 27, 34, 41
Depression	5, 9, 14, 18, 21, 23, 32, 35, 36, 44, 45, 48, 58, 61, 62
Anger	3, 12, 17, 24, 31, 33, 39, 42, 47, 52, 53, 57
Vigor	7, 15, 16, 38, 51, 56, 60, 63
Fatigue	4, 11, 29, 40, 46, 49, 65
Confusion	8, 28, 37, 50, (54), 59, 64

## ROSENBERG SELF-ESTEEM SCALE

**Instructions** : Place a circle around the number which best describes you. There are no right or wrong answers so try to be completely honest in your responses. Thank you.

- 1      strongly agree*  
*2      agree*  
*3      disagree*  
*4      strongly disagree*

- |                                                                                |   |   |   |   |
|--------------------------------------------------------------------------------|---|---|---|---|
| 1. On the whole, I am satisfied with myself.                                   | 1 | 2 | 3 | 4 |
| 2. At times I think I am no good at all.                                       | 1 | 2 | 3 | 4 |
| 3. I feel that I have a number of good qualities.                              | 1 | 2 | 3 | 4 |
| 4. I am able to do things as well as most other people.                        | 1 | 2 | 3 | 4 |
| 5. I feel I do not have much to be proud of.                                   | 1 | 2 | 3 | 4 |
| 6. I certainly feel useless at times.                                          | 1 | 2 | 3 | 4 |
| 7. I feel that I am a person of worth, at least on an equal plane with others. | 1 | 2 | 3 | 4 |
| 8. I wish I could have more respect for myself.                                | 1 | 2 | 3 | 4 |
| 9. All in all, I am inclined to feel that I am a failure.                      | 1 | 2 | 3 | 4 |
| 10. I take a positive attitude toward myself.                                  | 1 | 2 | 3 | 4 |

## ROSENBERG SELF-ESTEEM SCALE

### Instructions for Scoring

The Rosenberg Self-Esteem Scale is divided into six scale item scores which are summed to give a total score.

Recode items 1, 3, 4, 7, and 10 as : 1 = 1, 2 = 1, 3 = 0, 4 = 0

Recode items 2, 5, 6, 8, and 9 as : 1 = 0, 2 = 0, 3 = 1, 4 = 1

Scale I composed of items 3, 7, 9

Scale II composed of items 4, 5

Scale III composed of item 10

Scale IV composed of item 1

Scale V composed of item 8

Scale VI composed of item 2, 6

If items 3 + 7 + 9 > 1; Scale I = 0

If items 3 + 7 + 9 < or = 1; Scale I = 1

If items 4 + 5 > 1 Scale II = 0

If items 4 + 5 < or = 1; Scale II = 1

If item 10 = 1; Scale III = 0

If item 10 = 0; Scale III = 1

If item 1 = 1; Scale IV = 0

If item 1 = 0 Scale IV = 1

If item 8 = 1: Scale V = 0

If item 8 = 0; Scale V = 1

If items 6 + 2 > 1; Scale VI = 0

If items 6 + 2 < or = 1; Scale VI = 1

Sum six scales for total score. Higher scores indicate lower self-esteem.

## PSYCHOLOGICAL RESPONSES TO INJURY INVENTORY

Name \_\_\_\_\_ Date \_\_\_\_\_ Sex M/F

Main Sport \_\_\_\_\_ Age \_\_\_\_\_

Present level of participation (e.g. club, country, national) \_\_\_\_\_

How long is it since your injury occurred? \_\_\_\_\_

Nature of injury (if known) \_\_\_\_\_

This inventory contains a number of statements about the experience of injury. Read each statement and indicate by circling the relevant point on the scale, the extent to which the statement reflects how you presently feel. There is no right or wrong answer, so answer honestly. This information will be treated in strictest confidence.

	<b>Strongly Agree</b>			<b>Strongly Disagree</b>	
1. I question why it happened to me.	5	4	3	2	1
2. I can't help but feel bitter.	5	4	3	2	1
3. I cannot work out why my injury happened.	5	4	3	2	1
4. I have been cheated.	5	4	3	2	1
5. Physically I feel a lot stronger.	5	4	3	2	1
6. I have much more confidence in myself.	5	4	3	2	1
7. I am aggrieved at what has happened.	5	4	3	2	1
8. I am beginning to feel like myself again.	5	4	3	2	1
9. I try to deny what has happened.	5	4	3	2	1
10. I get unduly upset by things unrelated to my injury.	5	4	3	2	1

	<b>Strongly Agree</b>			<b>Strongly Disagree</b>	
11. I am devastated by the injury.	5	4	3	2	1
12. I feel as if I have been cheated by being injured.	5	4	3	2	1
13. I feel a sense of apathy.	5	4	3	2	1
14. I lack motivation.	5	4	3	2	1
15. I am unable to enjoy myself.	5	4	3	2	1
16. I am unable to relax.	5	4	3	2	1
17. I don't feel like mixing with other performers.	5	4	3	2	1
18. I am unusually anxious.	5	4	3	2	1
19. Socially, I feel like an outcast.	5	4	3	2	1
20. I feel a sense of sadness.	5	4	3	2	1
21. I experience a feeling of emptiness.	5	4	3	2	1
22. I suffer from increased tension.	5	4	3	2	1
23. I have difficulty accepting that I am injured.	5	4	3	2	1
24. I am seeking support from friends.	5	4	3	2	1
25. My world has fallen apart.	5	4	3	2	1

## PSYCHOLOGICAL RESPONSES TO INJURY INVENTORY

### Instructions for Scoring

The PRII measures five sub-scales, with five items comprising each sub-scale. These are as follows:

<b>Sub-scale</b>	<b>Items</b>
Devastation	11, 21, 25, 20, 23
Dispirited	7, 9, 13, 14, 19
Reorganization	5, 6, 8, 22*, 24
Attempts to Rationalize	1, 2, 3, 4, 12
Isolation	10, 15, 16, 17, 18

\* Denotes reversed item.

The items are scored from 5 to 1 as indicated on the inventory with the exception of item 22, where the scoring should be reversed. Total scores for each sub-scale range from a possible low of 5 to a high of 25.

**CONTEXT B**

1. Injuries occur for numerous reasons. (For example: player inattention, lack of fitness/skill, opponents/ teammates, environmental conditions facilities).

Please indicate the factors you feel contributed to your injury.

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2. What is your estimate of the number of days of practice/competing that you will miss?

\_\_\_\_\_ days.

**CONTEXT C**

1. Injuries occur for numerous reasons. (For example: player inattention, lack of fitness/skill, opponents/ teammates, environmental conditions or facilities). Please indicate the factors you feel contributed to your injury.

---

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---

---

2. Please indicate any disruptions or inconveniences your injury has caused (i.e. mobility problems, missing class, etc.)

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---

3. Please indicate the number of days remaining until you return to practice.

\_\_\_\_\_ days.

## **THE EMOTIONAL RESPONSES OF ATHLETES TO INJURY QUESTIONNAIRE**

Adapted from Smith, Scott, & Weise, (1990b)

1. If you could be any thing you wanted in life, what would that be?
2. List in order of preference the sports and activities that you participate in.
3. Can you tell me about your reasons for participating in sport?  
  
- stress management, competition, socialization, pursuit of excellence, fitness, personal improvement, fun, discipline, outlet for aggression, weight management, well-being.
4. How would you define an athlete?
5. Would you describe yourself as an athlete?
6. What is the nature of your injury?
7. What factors do you feel contributed to your injury?
8. Do you feel those factors affected how you feel emotionally towards your injury?
9. When did your injury occur? pre-season, mid-season, end-season.  
How did the timing of your injury impact on your feelings towards it?
10. How much time per week were you spending at sport practice and competition before your injury? Has activity restriction had a psychological impact?
11. Were you under any stress at the time of your injury? If so what?
12. How have you been feeling emotionally since the injury?  
- helpless, tense, bored, depressed, angry, frustrated, shocked, discouraged, frightened, optimistic, in pain, relieved.
13. How would you rate the significance as to how you are feeling now because injury? rank 12 = high; 0 = low
14. What percentage of your recovery have you made to your pre-injury status?

15. What is your estimated date of return to sport/activity?
16. Do you have fears about returning to sport? If so what are they?
17. Do you plan to return to the same sport in which you were injured in?
18. Are you a motivated person for exercise? (1 - 10)
19. What is your current rehabilitation program? exercise/times per week
20. Are you able to work out on any other equipment or exercise modalities?
21. Are you encouraged to do your rehabilitation exercises during team practices: Do you still have contact with or feel connected to the team? Do you feel contact helps with your recovery?
22. Are you encouraged in sport by significant others?
23. Do you have a strong family support system or close friends who know about your injury?
24. Do these support systems help you cope with your injury?
25. Could you give me some examples of the kinds of things that you found helpful/not.
26. Could you tell about how your injury has impacted on your life?  
- missing classes, mobility etc. What difficulties have you encountered?
27. Can you identify ways that your injury has had a positive effect on your life?  
What has this experience taught you? What have you learned about yourself?

## **Appendix C**

**Transformations**

**Repeated Measures ANOVA on Data Pre-Injury, Post-Injury 1 and Post-Injury 2**

**Descriptive Statistics of Context**

**Pearson Product-Moment Correlations Between The POMS and The Psychological Responses to Injury Inventory**

Transformations

POMS Factors	Raw Data $t$	Raw Data $p$	Transformed Data $t$	Transformed Data $p$
TEN	-.608	.544	.951	.343
DEP	.703	.483	.897	.371
ANG	-.189	.060	1.76	.415
VIG	1.47	.142	-1.38	.168
FAT	-2.38	.018	-2.38	.018
CON	-.563	.574	.751	.453

Note. VIG was squared and square root transformations were applied to ANG, CON, DEP, and TEN sub-scales. FAT was not skewed and remained the same.

Repeated Measures ANOVA on POMS Data Pre-Injury, Post-Injury 1 and Post-Injury 2

Sub-scale	Pre-Injury M (SD)	Post-Injury 1 M (SD)	Post-Injury 2 M (SD)	p
TEN	13.63 (5.0)	12 (6.9)	13.14 (5.4)	0.491
DEP	10.67 (9.4)	16.07 (12.6)	17.29 (8.26)	0.084
ANG	12.23 (9.9)	15 (10.1)	18.71 (17.44)	0.541
VIG	17.33 (5.6)	11.63 (7.2)	9.43 (4.79)	.007*
FAT	14.53 (6.6)	11.3 (6.9)	14 (5.89)	0.855
CON	9.5 (4.5)	9.53 (4.3)	10.57 (4.24)	0.325

Note. Pre-Injury n = 30; Post Injury 1 n = 30; Post injury 2 n = 7. \* p < .0083 (2 - tailed)

Descriptive Statistics of Context

Sub-scale	Self ( $n = 9$ ) M (SD)	Other ( $n = 15$ ) M (SD)
TEN	12.44 (8.5)	11.67 (5.86)
DEP	16.67 (13.82)	17.20 (14.23)
ANG	19.00 (11.86)	12.33 (9.99)
VIG	11.44 (9.10)	9.93 (6.23)
FAT	11.78 (7.38)	11.67 (7.10)
CON	9.11 (4.26)	9.8 (4.54)

Pearson Product-Moment Correlations Between The POMS and The Psychological Responses to Injury Inventory

	DEV	DIS	REO	RAT	ISO
TEN	0.012	0.278	0.297	-0.028	0.345
DEP	-0.328	-0.098	-.318	-0.228	0.22
ANG	0.072	0.271	-0.055	.507*	0.266
VIG	0.172	-0.255	.527*	-0.024	-0.378
FAT	-0.193	-0.021	-0.277	0.173	0.132
CON	-0.222	-0.004	0.08	-0.023	0.08

Note. \* Correlation is significant at the 0.05 level (2-tailed).