

## **Psychological Responses of Division I Female Athletes Throughout Injury Recovery: A Case Study Approach**

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### **Abstract:**

Using the Integrated Model of Response to Sport Injury as a theoretical framework, athletes' psychological strengths and emotional responses were explored throughout the injury process using a case study approach. Four Division I athletes completed measures of mental toughness, hardiness, and optimism before their season (time 1), once they became injured (time 2), midway through rehabilitation (time 3), and when they were cleared to participate (time 4). Coping behavior, psychological response, and rehabilitation adherence were recorded at time 2–time 4, while recovering. In addition, interviews were conducted after time 4. Mental toughness, hardiness, and optimism varied over time and across cases, with broad individual differences in response to injury. Athletes experienced a loss of athletic identity combined with feelings of guilt and helplessness over the initial stages of injury, but positive experiences were also found. All cases also reported playing through injury. Understanding the psychological strengths and responses of athletes can help professionals work with injured athletes.

**Keywords:** athletes | injury | Integrated Model of Response to Sport Injury | case study

### **Article:**

Each year sports-related injuries to children and young adults result in nearly three million emergency room visits, 30,000 hospitalizations, and billions of dollars in healthcare expenditures (Covassin et al., 2012). Sport injury is an expensive, time-costly epidemic that society is facing (American Academy of Orthopaedic Surgeons, 2009; Hootman, Dick, & Agel, 2007; Knowles, 2010; Powell, Barber-Foss, 1999). Sport injury research has grown due to the dramatic increase in injuries reported annually. Beyond the physical and financial implications that injury may create for some, injury also can impact an individual's confidence, self-esteem, and sense of

identity (Brewer, 1994; Brewer, 2007; Wiese-Bjornstal, Smith, Shaffer, & Morrey, 1998). Injury is a source of stress that an individual may perceive as threatening, which then leads to subsequent emotional, behavioral, and physical responses (Wiese-Bjornstal et al., 1998). Understanding the psychological, emotional, and behavioral responses of injured athletes may help researchers and practitioners assist injured athletes by facilitating a more effective recovery (Tracey, 2003).

Knowledge on how athletes respond to and cope with sport injury has increased with the development of several models including stage models of grief and loss (Kubler Ross, 1969; Evans & Hardy, 1995), Biopsychosocial model of sport injury and rehabilitation (Brewer, Andersen, & Van Raalte, 2002), and the Integrated Model of Response to Sport Injury (Wiese-Bjornstal et al., 1998). While stage models provided insight into how individuals may progress through coping, models such as the Biopsychosocial model and Integrated Model of Response to Sport Injury captured individual differences and the dynamic and complex process of coping, which involves a number of social, psychological, and physiological factors. One of the most widely recognized integrated models of response to sport injury was developed by Wiese-Bjornstal and colleagues in 1998. The Integrated Model of Response to Sport Injury (Wiese-Bjornstal et al., 1998) theorizes that personality, social, and emotional factors all influence how an individual copes following an injury. The individual's interpretation (or appraisal) of an athletic injury determines the emotional response (e.g., anger, depression, relief). Cognitive appraisals are influenced by the interaction of personal factors (i.e., dispositional and/or historical attributes of individual) and situational factors (i.e., injury-related characteristics and aspects of social and physical environments). The emotional response to the injury, in turn, affects behavioral outcomes in the injury rehabilitation process (e.g., adherence to rehabilitation regimens). Personality, social, and emotional factors also play a role in how an individual copes with a stressor. For example, a mentally tough person may perceive an ankle sprain as manageable and follow rehabilitation protocols to deal with their injury while a highly anxious person may cope with the same injury using avoidant coping methods. The current study focuses specifically on personal characteristics such as mental toughness, hardiness, and athletic identity, as well as emotional and behavioral responses to sport injury.

Wiese-Bjornstal et al.'s (1998) sport injury model posits that mental toughness, hardiness, and the individual's athletic identity influence how the athlete responds to injury. Mental toughness is an overall personality characteristic shaped by an interaction of both environmental and innate characteristics, encompassing attributes such as being resilient, having unshakeable self-belief, being committed, having superior concentration skills, thriving on pressure, and coping effectively with pressure and adversity (Connaughton, Hanton, & Jones, 2010; Crust, 2008; Sheard, 2009). As such, mental toughness represents a constellation of positive psychological variables that help to buffer the harmful effects of stress and allow individuals to perform consistently well regardless of situational factors (Clough, Earler, & Sewell, 2002). While multiple definitions have been proposed for mental toughness, based on the literature and

existing research, for this study mental toughness is defined as the ability to cope (better than one's opponents) to remain determined, focused, confident, and in control under pressure (Goldberg, 1998; Jones et al., 2002; Loehr, 1986; Loehr, 1994). Resilience, positive self-perceptions, optimism, and confidence are components that contribute to mental toughness (Clough, Earler, & Sewell, 2002). Higher levels of mental toughness have been positively related to coping with stress and maintaining high levels of competitive performance (Golby, Sheard, & Lavallee, 2003). In addition, high levels of mental toughness have been positively related to problem or approach coping strategies and inversely associated with avoidance coping strategies (Nicholls, Polman, Levy, & Backhouse, 2008). Resilience, optimism, and positive self-perceptions are important components that can affect athletic performance. Mental toughness has been linked to mental factors such as performance, coping styles, positive attitudes, and other behavioral tendencies (Crust & Clough, 2005; Nicholls, Polman, Levy, & Backhouse, 2008). Research that has focused on optimism and performance-related factors has found that optimism enhances motivation, persistence, and performance (Carver & Scheier, 2002b; Taylor & Brown, 1988). Furthermore, optimism has been positively related to the belief that one has control of stress in one's life (Fontaine, Manstead, & Wagner, 1993). Subsequently, athletes who reach high levels of performance and success are found to have a greater control over their behavior, and more optimistic perceptions about their future (Taylor & Brown, 1988).

Hardiness is similar to optimism in its effect on performance. Hardiness was conceptualized by Kobasa (1979) as a personality component similar to resiliency. Kobasa (1979) characterized hardiness as encompassing three main components: commitment, control, and challenge. According to Kobasa (1979), hardy individuals are committed, vigorous, and have an internal locus of control. Individuals who are not hardy are characterized by alienation, low energy, and external locus of control. Hardy and nonhardy individuals may differ in how stressful situations are appraised. Delahij, Gaillard, and van Dam (2010) found that individuals with higher hardiness scores had more effective coping styles (more task, less emotion) and consequently showed more effective coping behavior than individuals with lower hardiness scores. Mental toughness has been thought to incorporate hardy qualities and perhaps be one in the same (Clough, Earler, & Sewell, 2002). According to Clough et al. (2002), hardiness differs from mental toughness in that it fails "to capture the unique nature of the physical and mental demands of competitive sport" (p. 37). In addition, researchers have found weak correlations between mental toughness and hardiness and have concluded that they are two separate constructs (Sheard & Golby, 2006; Sheard, Golby, & van Wersch, 2009).

The third personality characteristic examined in the current study is athletic identity. Athletic identity is defined as the degree to which an individual defines oneself in the role of athlete (Brewer, Van Raalte & Linder, 1993). This could be problematic in the sport injury context because research has shown that those higher in athletic identity react more negatively to injury than individuals lower in athletic identity (Brewer, 1993; Brewer, 1994; Evans & Hardy, 1995). For example, Brewer (1993) found that athletes scoring high on the Athletic Identity

Measurement Scale (AIMS) responded to hypothetical career ending injuries with depressive reactions. However, empirical evidence on how athletic identity may affect coping response patterns to athletic injury is limited.

Beyond the effects of personality characteristics on response to injury, a variety of studies have examined how athletes' emotions are influenced by sport injury. Emotional responses from injury can range from a positive attitude and outlook to negative emotions of fear, anger, frustration, tension, depression, and anxiety (Brewer, 1993; McDonald & Hardy, 1990; Smith et al., 1990; Smith et al., 1990; Tracey, 2003). While support has been shown that athletes' emotional response is influenced in part by rehabilitation progress, other research has supported how emotional disclosure may alter responses to injury (McDonald & Hardy, 1990). For example, Mankad and Gordon (2010) found that injured athletes benefited from a written emotional disclosure intervention by feeling less devastated, dispirited, cheated, and restless by their injury. Mankad and Gordon (2010) suggest that the emotional responses of injured athletes follow a grief-like response and to enhance psychological rehabilitation, working through athlete's grief-related responses and developing a greater understanding of the injury event may be key elements. While not all athletes experience similar patterns in response to injury, it is important to note that both positive and negative reactions may occur depending on the individual (Tracey, 2003; Wrisberg & Fisher, 2005). Following athletes three weeks post-injury, Tracey (2003) found that athletes experienced fluctuations in feelings of loss, decreased self-esteem, frustration, and anger. Thoughts and affect changed over time to view the injury as a challenge, approached with a positive attitude. The injury rehabilitation process was viewed as a learning experience in which participants discovered aspects of themselves and emotions experienced in injury.

Literature on behavioral responses to injury, specifically coping literature, has been consistent in reporting coping as a dynamic process that often incorporates more than one strategy with a single stressor. Folkman and Lazarus's work on coping (Folkman, 1984; Lazarus & Folkman, 1984) has provided a foundation for research on coping with sport injury. The transactional model of coping defines coping as "a process of constantly changing cognitive and behavioral efforts to manage specific internal and/or external demands or conflicts appraised as taking or exceeding one's resources" (Lazarus and Folkman, 1984, p 141). Coping efforts have been organized in a number of different ways including whether they reflect cognitive or behavioral strategies, whether they are problem or emotion-focused, and whether they are directed toward (approach) or away from (avoidance) the demand or conflict (Clarke, 2006; Connor-Smith & Flachsbart, 2007; Duangdao & Roesch, 2008; Prati & Pietrantonio, 2009).

Coping abilities have been reported as a central factor in athletic injury; however, research on specific coping responses used by injured athletes is limited (Andersen & Williams, 1988). Three longitudinal studies have been conducted that examine coping responses throughout an injury recovery process. Injured athletes use more instrumental and problem-solving coping strategies as rehabilitation progresses (Johnston & Carroll, 2000; Quinn & Fallon, 1999; Udry, 1997).

Specifically, athletes began by using coping strategies to gain knowledge about their injury, but then progressed to using techniques that would help them with their recovery (e.g., imagery). In retrospective studies athletes' coping behaviors varied over the course of the season depending upon the phase of injury that the athlete was in, the specific challenge and stressors posed for the athletes, and the transition between phases marked by decisional processes (Bianco, Malo, & Orlick, 1999). Initially, athletes reported seeking information about the injury, trying alternative treatments, engaging in healing or performance imagery, adopting an aggressive approach to rehabilitation, and taking a break from rehabilitation. Afterward, athletes reported building physical strength, readjusting goals, and pacing (working at their own pace and resting when tired). The few longitudinal studies that exist suggest that at some point through the rehabilitation process athletes use problem-focused or some adaptive coping strategy to dealing with injury. Nonetheless, the stability of athletes' coping efforts over time remains unclear given the varied findings. Thus, further longitudinal research on athletes' coping responses through injury and recovery is needed.

Social support has been found to play a role in coping with athletic injuries (Udry, 1997; Gould, Udry, Bridges, & Beck, 1997; Yang, Peek-Asa, Lowe, Heiden, & Foster, 2010). Research has supported that more than half of injured athletes seek out and use social resources (Gould et al., 1997). Positive social support can serve as a protective factor that helps to reduce distress after an injury and improve motivation during rehabilitation. Injured athletes seek out and receive different types of social support from a variety of sources within their social environment (Yang et al., 2010). Coaches are a good source for technical support while teammates can provide support through a shared social reality and listening (Rosenfeld et al., 1989). Not all forms of social support are perceived as beneficial; support from family, teammates, and coaches can play positive and negative roles (Udry et al., 1997). Among skiers that incurred season-ending injuries, the majority reported positive support from family and teammates, including emotional support and understanding, motivational support, keeping in contact, tangible support, and other skiers providing a frame of reference. The negative support came mostly from athletes reporting coaches being distant, insensitive to injury, and portraying a lack of belief in athlete's ability to recover from injury. In general, social support is beneficial to the recovery process when there are several sources of support but more importantly when sources are perceived by the injured athlete as being beneficial to their recovery process.

Overall, sport injury is a dynamic and complex process that involves many factors that can influence athletes' reaction as well as recovery from injury. The Integrated Model of Response to Sport Injury (Wiese-Bjornstal et al., 1998) that guides researchers suggests that personality components such as mental toughness and athletic identity may be avenues that facilitate recovery in some, while creating devastating experiences for others. As for emotional response, depression is experienced initially; while a multitude of other emotions are experienced as recovery progresses. For some, injury is a negative experience filled with depression and sorrow

while others view injury as a learning process that enables them to be more empathetic with fellow injured teammates.

Coping behavior equips athletes to successfully recover from injury. Although research has shown that instrumental coping/problem focused coping is used primarily by injured athletes, more work is needed to determine which coping methods lead to better recovery. Social support also influences rehabilitation and recovery from injury, including support from family members, teammates, and coaches. The present study attempted to fill in some of the gaps in the literature and gain a deeper understanding by following athletes throughout their injury and recovery process from a baseline before the athlete became injured until they returned to play.

## **Purpose**

The purpose of this research was twofold: (1) to examine athletes' psychological strengths (i.e., mental toughness, hardiness, and optimism) and emotional response to sport injury and rehabilitation and coping resources; and (2) to examine individual differences and changes over time from injury to being cleared to play in these profiles. In addition athletic identity, rehabilitation adherence and psychological reaction to sport injury were assessed to gain further insight into athletes' responses to injury.

## **Method**

### **Participants**

Four female Division I athletes were followed from baseline throughout their recovery from injury. Participants ranged in age from 20–21, were in their sophomore or junior year when the injury occurred, and played either soccer or softball.

### **Measures**

***Mental Toughness Scale; MTS.*** The MTS (Madrigal, Hamill, & Gill, 2013) is an 11-item scale used to measure mental toughness. Participants use a 5-point Likert scale to rate their agreement with each statement. Items are summed and higher scores indicate a greater degree of mental toughness. Scores range from 11–55. Time 1 (preseason) scores demonstrated good reliability, Cronbach's  $\alpha = .83$ . The MTS has demonstrated good convergent validity with elements such as flow ( $r = .62, p < .05$ ), good internal reliability (Cronbach's  $\alpha = .86$ ), and 1-week test-retest reliability = .90. The MTS was assessed at all four time points (preseason, onset of injury, midway through rehabilitation, and cleared to play).

***Psychological Performance Inventory-A; PPI-A.*** The PPI-A (Golby, Sheard, & van Wersch (2007) measures mental toughness. The 14-item PPI-A is a shortened version of the 42-item inventory (Loehr, 1986). Participants indicate their level of agreement with each statement using a 5-point Likert scale. The PPI-A yields an overall mental toughness score, as well as scores for four subscales: determination (3 items), self-belief (4 items), positive Cognition (4 items), and

visualization (3 items). Possible subscale scores range from 3–20 and total scores from 14–70. Reliability for time 1 (preseason) was good with Cronbach's  $\alpha = .78$ . The PPI-A was assessed at all 4 time points. The PPI-A was used as a secondary measure of mental toughness to build on psychometric property of the MTS.

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***Life Orientation Test-Revised; LOT-R.*** The LOT-R (Scheier, Carver, & Bridges, 1994) is a 10-item scale used to measure optimism. Participants use a 5-point Likert scale to note the level of agreement with each item. Four items are filler items not used for scoring, and all remaining items are summed for a total score on optimism. Scores range from 6–30. Reliability for the scale using time 1 (preseason) scores was moderate, Cronbach's  $\alpha = .69$ . The LOT-R was assessed at all four time points.

***Athletic Identity Measurement Scale; AIMS.*** The AIMS (Brewer, Van Raalte, & Linder, 1993) is a 10-item scale with four subscales that assess self-identity, social identity, exclusivity, and negative affectivity (Martin et al., 1995). Test-retest reliability (.89), internal consistency (.80–.93), and concurrent validity (Brewer, Van Raalte, & Linder, 1993) as well as construct validity via factor analysis have been demonstrated (Martin et al., 1995). For each item, participants responded on a 7-point scale with 7 anchored by *strongly agree* and 1 anchored by *strongly disagree*. The AIMS was assessed preseason, and when cleared to play, to assess whether athletes would achieve their baseline measure of athletic identity once recovered from injury.

***Brief COPE; Bcope.*** The BCope (Carver, 1997) is a 30-item modified version developed based on The COPE Inventory (Carver, Scheier, & Weintraub, 1989) and assesses 15 coping strategies. Participants rate the frequency of using particular coping methods for the stressful situation (i.e., injury). Coping strategies were grouped into 3 domains: (1) problem-focused (active coping, planning, restraint coping, seeking of instrumental social support; total score of 32); (2) emotion focused (seeking of emotional social support, positive reinterpretation, acceptance, denial, turning to religion; total score of 40); and (3) avoidant-focused (venting, humor, behavioral disengagement, substance abuse, self-distraction; total score of 48). The BCope was assessed at the onset of injury, midway through rehabilitation, and when cleared to play.

***Psychological Response to Sport Injury Inventory; PRSII.*** The PRSII (Evans, Hardy, Mitchell, & Rees, 2008) was used to measure athletes' post-injury psychological responses. The PRSII consists of six subscales: devastation, dispirited, reorganization, feeling cheated, restlessness, and isolation. Each subscale has four items, apart from reorganization that consists of three items. Participants were asked to indicate the extent to which each statement reflected how they presently feel on a 5-point Likert-scale anchored at 1 (strongly disagree) and 5 (strongly agree). Each subscale score (with the exception of reorganization) ranges from a low of 4 to a high of 20. For reorganization, this equates to a low of 3 and a high of 15. Evans et al. (2008) provided evidence of content and predictive validity. The PRSII was assessed at the onset of injury, midway through rehabilitation, and when cleared to play.

***Rehabilitation Adherence Questionnaire; RAQ.*** The RAQ (Fisher, Domm, & Wuest, 1988) is a 25-item scale used to measure rehabilitation adherence. It is composed of 6 subscales: support from significant others (5 items), pain tolerance (5 items), scheduling (4 items), self-motivation (5 items), perceived exertion (3 items), and environmental conditions (3 items). Participants rate the level of agreement to each statement using a 4 point Likert-scale. Total RAQ scores range from 0–100. The RAQ was assessed midway through rehabilitation and when cleared to play.

***Semistructured interview.*** Semi-structured interviews based on the Integrated Model of Response to Sport Injury were used retrospectively to gain an in-depth understanding of the emotional, social, and behavioral patterns athletes progressed through as they recovered from their injury. These interviews were conducted once the athlete had been cleared to play their sport and lasted approximately 45 min. The semistructured interviews provided flexibility to sequence the questions in a logical flow of the interview (Lincoln & Guba, 1985). Probes were used where necessary to enhance the depth of response and richness of the data (Patton, 2002a). The interview guide comprised questions that explored (a) injury-related stressors (e.g., what did you find most stressful about being injured); (b) psychological and emotional responses to injury (e.g., how did you feel the injury would affect you, tell me about your emotional reaction to injury); (c) support received during injury rehabilitation (e.g., tell me about the support you had/didn't have/wished you had; give me examples of helpful and unhelpful support you received), and (d) changes in those three areas over recovery.

## **Procedure**

Recruitment began at the beginning of the academic year (i.e., August) as research staff coordinated with coaches from women's soccer, softball, and baseball who agreed to participate. Fifty-five injury-free athletes (29 male and 26 female) completed the baseline questionnaire (i.e., scales measuring optimism, hardiness, athletic identity, and mental toughness) from baseball ( $n = 29$ ), softball ( $n = 12$ ), and women's soccer ( $n = 14$ ). Athletic trainers from teams provided referrals for athletes who met injury requirements (i.e., sport injury that is expected to prevent/limit his/her sport participation for at least four days). Based on these requirements and contact with athletic trainers, four athletes met the criteria. These four participants completed surveys



immediately post-injury, midway through rehabilitation, and once they were cleared to play. Surveys assessed athletes' hardiness (Dispositional Resiliency Scale), mental toughness (Psychological Performance Inventory-A, Mental Toughness Scale), optimism (Revised Life Orientation Scale), coping styles (BCope), psychological response to injury (PRSI), and rehabilitation adherence (RAQ). Following the final questionnaire assessment at the time when they were cleared to play, participants scheduled a short interview that was conducted on a separate day from when the questionnaire had been completed.

## Data Analysis

Scores on all survey measures were calculated for each athlete at each time to develop a profile and explore changes over time in mental toughness, hardiness, optimism, athletic identity, sport confidence, as well as stress, rehabilitation environment, behavioral and emotional response to injury, and coping with injury orientations. Interview transcripts were read and reread several times by the first author to identify specific themes. The first author then listed all the raw data themes identified under injury-related stressors, psychological responses to injury, emotional responses to injury, and social support. Similar themes within each of those three categories were then grouped together under larger themes. Peer-debriefing was used as recommended by Lincoln and Guba (1985). A graduate assistant colleague reviewed the themes and groupings to check the author's interpretation. Then, the first author and graduate assistant met and discussed the themes and reached consensus on the themes and categories.

## Results

A case study approach was used to understand the psychological and emotional reactions to injury and the recovery process. To best represent the results, case profiles are presented for each athlete. Scores for Athlete 1 and 2 are presented in Table 1 and scores for Athlete 3 and 4 are presented in Table 2.

**Table 1.** Scores for Athlete 1 and 2 on all Measures Assessed

Measure (total)	Case 1				Case 2			
	Preseason	Injury onset	Rehab	Cleared to play	Preseason	Injury onset	Rehab	Cleared
MTS (55)	47	45	40	45	46	44	43	47
PPI-A (70)	49	55	57	58	64	51	53	58
Hardiness (45)	33	32	30	35	38	35	33	30
Challenge (15)	9	8	9	10	9	10	10	11
Commitment (15)	10	10	6	10	14	12	8	9
Confidence (15)	14	14	15	15	15	13	15	10
Athletic identity (70)	55	X	X	56	53	X	X	44

Optimism (30)	20	27	24	29	26	23	28	26
Rehab adherence (100)	X	X	64	59	X	X	59	56
Environment (12)	X	X	7	6	X	X	7	6
Pain tolerance (20)	X	X	12	7	X	X	11	13
Perc. exert (12)	X	X	12	10	X	X	11	9
Schedule (16)	X	X	9	8	X	X	8	6
Self-motiv. (20)	X	X	10	13	X	X	10	9
Support (20)	X	X	14	15	X	X	14	13
PRSI (95)	X	58	48	44	X	33	40	47
Cheated (20)	X	10	7	7	X	4	6	5
Devastated (20)	X	16	13	9	X	10	13	16
Isolated (20)	X	7	7	6	X	7	6	10
Reorganized (15)	X	10	9	15	X	6	6	5
Restless (20)	X	15	12	7	X	6	9	11
<b>Coping</b>								
Prob-focus (32)	X	16	23	25	X	18	19	14
Emot-focus (40)	X	27	29	27	X	22	22	20
Avoidnt-focus (48)	X	28	29	26	X	17	24	19

Note. X indicates measure was not assessed at that time point.

**Table 2.** Scores for Athlete 3 and 4 on all Measures Assessed

Measure (total)	Case 3				Case 4			
	Preseason	Injury onset	Rehab	Cleared to play	Preseason	Injury onset	Rehab	Cleared
MTS (55)	43	55	—	52	43	42	—	—
PPI-A (70)	58	65	—	56	52	56	—	—
Hardiness (45)	28	36	—	32	32	29	—	—
Challenge (15)	3	6	—	3	8	6	—	—
Commitment (15)	10	15	—	15	10	11	—	—
Confidence (15)	15	15	—	14	14	12	—	—

Athletic identity (70)	64	X	—	61	45	X	—	—
Optimism (30)	25	23	—	27	27	25	—	—
Rehab adherence (100)	X	X	—	50	X	X	—	—
Environment (12)	X	X	—	9	X	X	—	—
Pain tolerance (20)	X	X	—	8	X	X	—	—
Perc. exert (12)	X	X	—	8	X	X	—	—
Schedule (16)	X	X	—	8	X	X	—	—
Self-motiv. (20)	X	X	—	8	X	X	—	—
Support (20)	X	X	—	9	X	X	—	—
PRSI (95)	X	61	—	56	X	56	—	—
Cheated (20)	X	16	—	15	X	12	—	—
Devastated (20)	X	11	—	9	X	12	—	—
Isolated (20)	X	8	—	10	X	11	—	—
Reorganized (15)	X	9	—	9	X	12	—	—
Restless (20)	X	17	—	13	X	9	—	—
Coping			—				—	—
Prob-focus (32)	X	28	—	28	X	26	—	—
Emot-focus (40)	X	32	—	28	X	27	—	—
Avoidnt-focus (48)	X	24	—	27	X	26	—	—

Note. X indicates measure was not assessed at that time point; — indicates time point was not completed by athlete.

### **Athlete 1: Background/Profile**

Athlete 1 experienced an ACL meniscus tear during a preseason soccer game when she tried to perform a maneuver that required her right knee to stabilize after planting her left foot and turning to make a cut. The total length of rehabilitation was 6 months. Although the athlete experienced a season-ending injury, it was early enough in the season to be qualified to redshirt (i.e., the athlete would not lose a year of eligibility for playing her sport while she was recovering from her injury). Signs of impairment in the right knee were visible during the

summer, when the athlete experienced “shifting” in her knee and “heard a pop” when landing during soccer games.

This was the athlete’s second ACL injury (previous injury occurred on opposite knee) and her prior rehabilitation experience was described by the athlete as a “negative experience” due to scar tissue accumulating too quickly. Although the athlete was apprehensive toward her current rehabilitation, she perceived this injury rehabilitation as a better experience, “This one also went a lot better; I didn’t have any scar tissue issues . . . I was like no pain, this is so weird . . . I was waiting for it and it never came.” While fear of rehabilitation experience was one stressor reported by the athlete, another was the sense of letting the team down during season, as the athlete stated, “Not being able to be there and help them out . . . and having to sit through losses.”

***Injury response.*** Table 1 indicates scores on mental toughness (MTS), optimism, and hardiness indicated a decrease from the time of injury to midway through rehabilitation (MTS: 45, 40; LOT-R: 27, 24; DRS: 32, 30) but all those measures increased by the time the athlete had been cleared to play and returned to levels similar to baseline. The PPI-A measure of mental toughness showed a slightly different pattern but did increase from onset of injury to being cleared to play.

***Stressors.*** One of the leading stressors the athlete experienced was an inability to help the team while injured but her athletic identity did not change from preseason to being cleared to play (AIMS: 55, 56). However, based on the study design, athletic identity was not assessed during the injury and rehabilitation process, which might have provided insight into changes occurring during that time. Based on the interview, athletic identity during injury rehabilitation was in fact compromised. According to the athlete, athletic identity was a source of confidence,

I identify myself as an athlete and I get a lot of my confidence as an athlete because it’s something I can do very well so when like my ability to do all those things is taken away . . . was really difficult for me and was definitely an avenue cut off from me to have competence.

Feeling like part of the team throughout the injury could have facilitated a sense of athletic identity, as the athlete experienced support from teammates, family, and coaches throughout her rehabilitation. Initially, she felt isolated from the team when they would travel and be gone for multiple weekends, but it changed as rehabilitation progressed. “I think it changed more when I was able to do more and when they were here . . . definitely when I was able to jog, I was able to start practicing with them more.”

***Coping behavior.*** In regards to coping behavior, the athlete increased the use of problem-focused coping from the onset of injury to midway through rehabilitation and being cleared to play (16, 23, 25). Avoidant-focused coping, increased slightly at the midway through rehabilitation and decreased at return to play (28, 29, 26). Emotion-focused coping was relatively consistent across

the three times (27, 29, 27). These increases in problem-focused coping may have been due to the athlete progressing to a healthier, more positive state, through recovery as she adopted ways to cope with injury status, “in terms of seeing the progress within my rehab, like getting stronger, and seeing (leg) not so flabby/skinny, definitely helped me feel more confident in my ability to get better and play again.”

### **Athlete 2: Background/Profile**

This athlete’s initial injury experience occurred during an in-season soccer game in which she went to kick a ball in a volley (i.e., soccer term for ball in the air), when a player ran straight into her leg. The athlete was out for two weeks, but due to low numbers on the team, decided to play the rest of the season. This was the athlete’s first surgery-required injury, but she assumed having the surgery immediately postseason would allow her enough time to be ready for the upcoming season. The total rehabilitation time was four months. Although the athlete was entering the final stages of rehabilitation when cleared-to-play assessment occurred, the athlete still experienced pain while running which left her doubting the effectiveness of her rehabilitation program and unsure if she would be ready to return to her sport injury-free.

***Injury response.*** Athlete 2’s mental toughness scores fluctuated through rehabilitation but returned to preseason levels when she was cleared to play (MTS: 44, 43, 47; preseason, 46; PPI-A: 51, 53, 58, preseason 64). Again, there were discrepancies between the MTS and PPI-A; the MTS scores fluctuated while the PPI-A steadily increased over injury. Hardiness decreased as the athlete progressed through rehabilitation (DRS: 35, 33, 30, preseason 38), specifically in commitment and confidence. This is consistent with comments made by the athlete and her uncertainty of being ready for season:

I’m just really stressed out, like am I going to be ready for season. I just only started running. When I run I’m still in a lot of pain, so it’s like the unknown, I don’t really know what’s going to happen.

Interestingly, Athlete 2 decreased in athletic identity, from preseason to being cleared to play (AIMS: 53, 44). The athlete’s optimism also decreased from preseason to initial injury onset but then returned to preseason level when cleared to play (LOT-R: 26, 23, 26).

***Responses to rehabilitation.*** Although Athlete 2’s optimism score was similar to the other athletes, her injury experience was unique. In terms of psychological response to sport injury she reported feeling more devastated, isolated and restless from becoming injured to being cleared to play (PRSII: 33, 40, 47). Midway through rehabilitation, the athlete reported a moderate score of rehabilitation adherence (RAQ: 59). Based on subscales of the RAQ, pain tolerance, self-motivation, support, and schedule were influential in this low report of rehabilitation adherence. Based on comments in the interview, pain has been a consistent factor that has been upsetting to the athlete, especially in her current stage of recovery. According to Taylor and Taylor (1997), in this stage of returning to play (i.e., initial return), the athlete is testing the effectiveness of their

rehabilitation program. Although experiencing pain at this stage may be a common element in athletes returning to sport, the fact that this athlete is comparing her injury to a friend's who experienced no pain when she began running progressions may be harming her psychological well-being of recovery from injury. "A friend tore her ACL, when she started running, she didn't have pain, but I'm in such bad pain when I do things." This lack of confidence in rehabilitation effectiveness has led to feelings of uncertainty of how her final return to competition will go, "I mean now it's just I'm very emotionally unstable because it's like I really don't know what's going to happen."

**Coping behavior.** Other stressors that affected this athlete included the fact that this was her first surgery-requiring injury and her limited mobility. The length of rehabilitation was unexpected and needing crutches for 5 weeks added to the strain of the injury. "The first 5 weeks I was on crutches and that was the worst thing ever . . . it's really stressful because I felt like I didn't realize how long the rehab was going to take like they didn't tell me almost 4 months out." Through rehabilitation, the athlete remained consistent on emotional-focused coping (22, 22, 20) but decreased on use of problem-focused coping (18, 19, 14), while increasing on more avoidant-focused coping strategies (17, 24, 19).

### **Athlete 3: Background/Profile**

Athlete 3 broke a bone in her non-dominant hand while guest-catching for a pitcher in a softball preseason practice. The player tried to progress through rehabilitation quickly but needed to go back in the rehabilitation stages because the injury had not fully healed. The injury occurred two weeks before the start of the season, giving the athlete hope that she would be cleared and not miss many games in the four weeks she was expected to be out. Through persistent communication with her doctors and athletic trainer, she progressed through rehabilitation at a rapid pace. Due to this rapid pace of rehabilitation, we were unable to record quantitative information from the athlete at the midway rehabilitation point. The total rehabilitation time was five weeks.

**Injury response.** Although the athlete reported an increase in mental toughness from preseason scores to being initially injured (MTS: 43, 55; PPI-A: 58, 65), mental toughness throughout rehabilitation decreased from the onset of injury to being cleared to play (MTS: 55, 52; PPI-A: 65, 56). Similarly, although hardiness scores were higher post-injury compared with pre-injury (DRS: 28, 32), there was a decrease in hardiness from the onset of the injury to being cleared to play (DRS: 36, 32).

**Stressors.** Stress may explain these changes in hardiness and mental toughness. The athlete reported feeling a change in stress when her rehabilitation took a step back, "I had to actually go back and step backwards and be put back into a soft case for another 10 days."

For an athlete who is adamantly trying to be cleared to play for conference games, a setback in rehabilitation could be a major change in stress. This stress was further exacerbated by her

relationship with the team athletic trainer and lack of communication, which the athlete perceived as dishonesty:

I went in and I was brutally honest with AT [as far as pain level of hitting and catching] and I was like I don't want the doctors involved . . . I don't want to lose control of the situation again, she was like ok, I come to practice later to find out the doctor had been called . . . once again the power was taken out of my hands.

Following the experience of deceit as perceived by the athlete, she commented "I've never trusted [athletic] trainers before in my life, and I did this time thinking it would be different." The athlete noted a change as she progressed further through rehabilitation, "while it was negative at the beginning, it slowly progressed and got a little bit better the closer and closer I got to playing." Athlete 3's athletic identity stayed consistent (AIMS: 64, 61) and she increased in optimism through rehabilitation (LOT-R: 23, 27). However, the athlete reported feeling a need to prove commitment and importance to the team while injured. "It's like I can't prove to the team that I want to be a part of the team because I can't do what they're doing." In other statements, the athlete spoke of her inability to showcase her talents early in preseason, "people didn't realize I might have an impact; I might be an important player." The athlete also reported a decrease in psychological response to sport injury (PRSII: 61, 56), feeling less devastated and restless as rehabilitation progressed. As far as coping behavior, the athlete remained consistent in problem-focused coping (28, 28) while decreasing in emotion-focused (32, 28) and avoidant-focused coping (24, 27) through rehabilitation.

#### **Athlete 4: Background/Profile**

Athlete 4 experienced a labrum tear that required surgery in her dominant shoulder during preseason due to overuse. The athlete decided to undergo surgery immediately, to give her enough time to recover for the following season. The athlete completed measures preseason and following the onset of injury, but she did not complete measures during rehabilitation or when cleared to play. She participated in the interview in the beginning of the following season when she was injury-free. The total length of rehabilitation was eight months.

***Injury response.*** Mental toughness scores from preseason to the onset of injury, the athlete remained consistent (MTS: 43, 42; PPI-A: 52, 56). Slight disparities existed between the MTS and PPI-A with the MTS staying a consistent while the PPI-A increased from preseason to being injured. There was a slight decrease in hardiness once the athlete became injured (DRS: 32, 29), specifically in the form of confidence. This decrease in hardiness may have been due to the uncertainty of the extent of injury that took place for the month following the initial signs of injury. The athlete had to get two MRIs performed before knowing the extent of the labrum tear, and this uncertainty of injury status was reflected in comments made by the athlete: "I felt like I was letting my team down because nobody knew for sure whether I was able to play or not." Besides feeling uncertain, the athlete also reported feeling nervous before surgery and doubting

what the effect of surgery may entail. The athlete reported having a positive mindset going into surgery but at the same time “didn’t know how (surgery) would go so at first I was nervous . . . I didn’t know if that was the end of my pitching career . . . I didn’t know then if [coach] would even want me back, and if she would redshirt me; thus, psychologically, I was so nervous.”

Although initial reactions to injury were uncertain, due to injury status and redshirt possibility, the athlete progressed to feeling more optimistic about the injury experience. This was evident in both measures of psychological response to injury (PRSII: 56) and comments by the athlete. Feeling restless was the only negative reaction indicated in initial response to injury. This may have been due to the stress experienced by pressure from the coaching staff on deciding whether she would be redshirted based on injury recovery progress. The athlete reported the coach telling her that “after surgery, recover well and perform well and we [coaching staff] knowing that you can pitch, we’ll redshirt you.” Her stress changed as the athlete experienced a coaching staff change while she was midway through rehabilitation. With new coaches, she viewed the experience as beneficial, the injury, according to the athlete, “. . . put me in a situation where I have another year to play, with the coaches I have now, I mean even afterwards through my surgery and rehab I really did feel like it was going to be for the best.”

**Support.** Unlike the other three athletes, Athlete 4 made comments related to social support in her interview. Support was provided by family, friends, athletic trainers, coaches (old and new), and teammates. Teammate support increased as rehabilitation progressed, “When [teammates] saw me start pitching again, they were supportive just because they saw me working hard, so they wanted to be more supportive for me.” While the old coaches showed mixed levels of support, the new coaches exhibited support from the beginning to end with good communication about redshirting and restrictions on pushing the athlete too hard. Communication with the athletic trainer about the injury was beneficial for the athlete; she stated “Getting knowledge of my injury, then being able to ask questions about the injury, about what’s going on in my shoulder . . . that’s what I needed.” The athlete reported using problem (26), emotion (27), and avoidant-focused (26) types of coping evenly at the onset of injury.

## **Discussion**

While each case was unique, similarities did exist in terms of initial stress following injury, emotional/psychological reactions to being injured, changes in these areas over rehabilitation, and support experienced. Furthermore, the concept of playing through injury was observed in each case. Although there were some individual differences responses on the surveys which indicated that athletes decreased in mental toughness, hardiness, and optimism from the time of the injury to midway through rehabilitation. This is in line with the research that shows more negative emotions as athletes progress through rehabilitation (Johnston & Carroll, 2000; McDonald & Hardy, 1990).



Major sources of stress following injury included letting the team down, uncertainty of playing, and lack of control. Several statements reflected a feeling of letting the team down or inability to help when the team experienced a loss. "I felt like I was letting my team down because nobody knew for sure whether I was able to play or not" (Athlete 4). Another form of stress was feeling a loss of control in the form of immobility and not knowing when they would be cleared to play. Athlete 2 reported a loss of control in ". . . not being able to walk, using crutches for the first time," while Athlete 4 adamantly stated "It was frustrating knowing my hand felt good and I could grip something but I didn't have any control over when I would start playing again." These forms of stress intensified as rehabilitation progressed. Feeling isolated from the team, loss of control, and pressure to prove self and abilities were evident as athletes reflected over the course of their rehabilitation experience. Athlete 1 stated that her recovery was ". . . stressful in that it was frustrating not being able to do things." The lack of control (from daily tasks and not being cleared to play) was viewed as a change in stress by those who did not expect their rehabilitation to take as long as it did. Not knowing the extent of rehabilitation or when the athletes would be cleared to play added another source of stress in that they were uncertain of being ready for season. As Athlete 4 reflected on finishing up the last stages of rehabilitation:

It started stressing me out because I'm like 'when am I going to see the end of this [pitching progression]' and then there were points where I'm like 'am I going to pitch as hard as I pitched before?'

Similarly, stress over uncertainty of being back at 100% was evident in other athletes:

I'm just really stressed out, am I going to be ready for season? I just only started running. When I run I'm still in a lot of pain, so it's like the unknown. I don't really know what's going to happen. (Athlete 2)

Stress response is only a fraction of an athlete's response to injury. According to Wiese-Bjornstal et al.'s (1998) integrated model, the stress response is linked to the psychological and emotional reaction to injury.

The initial psychological and emotional reaction to injury was marked with feelings of being upset, negative, useless, isolated, guilt over letting the team down, and a lack of athletic identity. This is consistent with previous literature that indicates a wide range of emotional responses to being injured such as having a positive attitude and outlook to negative emotions of fear, anger, frustration, tension, depression, and anxiety (Brewer et al., 1993; McDonald & Hardy, 1990; Smith et al., 1990; Tracey, 2003). The negative emotions experienced in the current study stemmed from the sources of stress the athletes experienced with being injured. Athlete 2 stated, "We really didn't know what it was, so I didn't know if I'd be out the rest of the season, so like emotionally I was like 'wow, this could be really bad'." As far as feeling negative from the onset of injury, Athlete 3 reported knowing "It was going to be negative from the exact moment in happened" and feeling a "black cloud like hanging over my head for like a week [after injury]."

Additionally athletes reported feeling useless in being restricted to only conditioning in some instances, “There was one day I ran 86 foul polls because I was so pissed, and I was like I had to something and if I can’t hit and can’t catch, I’m going to run” (Athlete 3). Other negative emotions stemmed from relationships with the coach, “At the beginning, it was like I was invisible, like once you’re hurt, you’re done” (Athlete 3). One athlete perceived the coach’s behavior toward her shifted once she became injured, feeling as if the coach was saying ‘I don’t need to see you, you don’t need to be on the field’ (Athlete 3).

Athletes in the current study experienced increased motivation and confidence in their ability to come back as they progressed through rehabilitation and noticed improvements. Udry’s (1997) study of U.S. skiers found injured athletes to positively interpret the injury as a learning experience. The skiers in Udry’s (1997) study reported becoming mentally stronger due to the injury and being able to now relate with other injured athletes, thus increasing their empathy for teammates. Most of the literature examining response to injury has looked at the emotional reaction to athletic injury rather than the moderating role of emotion on the behavioral responses. Emotions during the injury rehabilitation process could be a key factor in how that athlete behaves during this process (e.g., rehabilitation adherence, return to play).

In looking at the positive aspects of being injured, one athlete reported experiencing no benefits from the injury, while the others found some positives with being injured. With less time devoted to sport, injured athletes were able to focus more on academics and focus more on the basics/fundamentals of their sport. In addition, being injured brought an awareness of how important participating in sport was to the athletes. As Athlete 3 stated:

It proved a point for how bad I want to be out there, not that I didn’t know that, it just made it that much more, you know like a burning desire to get out there and play the field and do whatever I can do.

Support is critical to athlete’s recovery from injury. According to Myers and Sweeney (2005), social support is the number one predictor of positive mental health. Vealey (2001), in the sport psychology literature, identifies “providing social support” as one of the three main ways of increasing sport confidence. Researchers have found that treatment and the recovery process are enhanced by social support to injured athletes (Hardy & Crace, 1991; Wiese-Bjornstal & Wiese, 1987). Athletes in this study experienced support from family, friends, coaches, athletic trainers, and teammates. The presence of social support, particularly from family, friends, and physiotherapists had a beneficial effect upon the athletes’ emotional states. All athletes reported feeling very supported following their injury. Family and friends were encouraging and positive while teammates supported by listening and being a source of comfort. The athletic trainer in Athlete 4’s experience, gave informational support, reassured the athlete of the surgery process and kept things positive for the athlete.

The most effective support included being able to talk with others, encouragement from family and friends, communication with athletic trainer, and (for Athlete 1) working with a sport psychologist consultant. It is important that athletes felt supported throughout rehabilitation because athletes who perceive a lack of support for and control over their rehabilitation are more vulnerable to emotional distress following injury (Brewer et al., 1995). Having support and acknowledgment of hard work from family and teammates were viewed as effective types of support.

Effective support tools for Athlete 4 were family (“ . . . making sure I knew that I was going to get through this”) and teammates acknowledging working hard through rehab (“everybody kind of realizing that . . . and being positive about it”). Communication was big for other athletes, both with teammates, friends, and athletic trainers. Messages of encouragement and perseverance were positive forms of communication from family and coaches. Not all institutions provide sport psychology support for athletes; however one athlete was able to use the service provided at her institution and felt like her sport psychologist was probably one of the stronger support systems due to the candidness of their communication.

Playing through injury was reflected in many statements by athletes who adopted a play-through-anything mentality. Athlete 1 became injured while playing over the summer, but continued playing on an injured knee (“It didn’t hurt so I was like I’m still good”). Athlete 2 commented that “When I got injured, I couldn’t walk for a few days and then after I started walking, I was in pain but then I starting playing 2 weeks later and I was still in pain but we were just really low on numbers.” The athlete continued to play on her injured leg knowing that surgery would probably be required. Athlete 3 experienced her injury in a state of denial about the extent of her injury, “So when it happened, my initial reaction was like it’s not broken; it’s fine. It’s like I don’t need to see [team athletic trainer], I don’t need any part of training. I need no doctors, no x-rays, no nothing. It feels fine; I could do it.” Based on statements by the athlete, it was clear that she adopted her mentality of injury through her father and previous coaches telling her “At some point, you need to suck it up . . . you’re going to feel pain probably for the rest of your life just because that’s the nature of how we play this game. We never let anything heal; we just need to suck it up.” The athlete’s mentality was, “I don’t believe in people being too hurt to sit out. I believe that you can always suck it up, and you can always do better and always work harder.” This train of thinking influenced the relationship the athlete had with her athletic trainer: “If I would’ve known that all this would’ve happened I wouldn’t have said anything honestly.” Athlete 4 was influenced to push herself more so by her old coaches: “Coach at the time was kind of trying to push it, to see if I could actually, they wanted me to play really bad but the [athletic] training room . . . it was like a fight between them.”

### **Strengths and Limitations**

These four case studies offer a glimpse of psychological and emotional reactions and recovery from unique injuries that were different in nature and timing of occurrence (e.g., preseason

versus postseason). In addition, this study allowed for an in-depth look at athletes from a healthy state (preseason) to following them as they dealt with the initial onset of injury, rehabilitation process, and early elements of returning to play. The use of mixed methods with both quantitative and qualitative information provided a richer description of the athletes' experience with injury recovery.

Given that this was a case study approach with only four athletes, the findings cannot be generalized and definitive conclusions cannot be drawn. Limitations of the study included not assessing each athlete at all-time points and measurement inconsistencies within the two mental toughness scales. Although two cases were missing some information on their rehabilitation experience, the inclusion of the interviews, once the athlete had been cleared to play, provide further knowledge of the injury recovery experiences. While quantitative information on more athletes would have allowed statistical analysis, the information provided by these case studies was rich in detail on emotional and psychological adjustments to injury recovery. The use of a mixed-methods design strengthened the current study by obtaining multiple sources of information from the athletes. According to Sale, Lohfeld, and Brazil (2002) quantitative information may provide a way to obtain information that is separate from the observer while qualitative information may shed light on the changing nature of reality created through people's experiences; thus, the two methods serve complementary purposes.

Although the MTS and PPI-A are both measures of mental toughness, the results in this study were inconsistent. This reflects a general problem with the construct and measurement of mental toughness. Psychometric properties of the existing measures are not thoroughly established. More work is needed with larger samples to more clearly delineate the construct and establish valid measures of mental toughness.

## **Conclusion**

In conclusion, psychological and emotional adjustment to sport injury is a dynamic process that involves many factors that may be unique to the individual and resources available to them. Playing through injury was apparent in all cases, whether the athlete finished the season while injured, tried to rush through rehabilitation, or played until the injury had intensified to the point of being forced to sit out. Athletes experienced a loss of athletic identity combined with feelings of not being able to help the team. Most athletes were able to find a positive experience from their injury. Two athletes decreased in mental toughness and hardiness from the onset of injury to rehabilitation, while the other two decreased in mental toughness from preseason to onset of injury. Situational factors such as position on the team, time of the season, type of season, and previous injury experiences may affect reactions. Mental toughness, hardiness, and optimism were not constant in any case, and these individual differences may be a major influence on injury response and reaction. More research is needed on factors that may influence an athlete to play through injury (or sit out when injured).

Through examining athletes on an individual level, sport injury research may more closely align with the healthcare professional and the one-on-one role that is customary in such settings. Knowing the psychological strengths (or deficiencies) of athletes can help health care professionals in determining ways to motivate athletes as well as help monitor their emotional and psychological mental state in recovering from injury. These areas of psychological strengths and adaptive coping could be targeted in rehabilitation, which could improve the athlete's psychological response to rehabilitation as well as perhaps reducing the length of time out of the game and emotional turmoil. As a result, researchers might better support both athletes and their healthcare providers' recognition of the ways that personality and coping resources impact emotional adjustment and rehabilitation behaviors.

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