

THE UNIVERSITY OF HULL

The Psychology of Anterior Cruciate Ligament Injury Rehabilitation amongst  
Professional Rugby Union Players

Being a Thesis submitted for the Degree of Doctor of Philosophy

In the University of Hull

By

Fraser Carson M.Sc.

Ohio University, USA

July 2012

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## ACKNOWLEDGEMENTS

There are a number of people who have assisted me throughout the completion of my thesis that deserve my full gratitude. Firstly the 5 players who gave up their time and were so dedicated and receptive to the process. Also to my wife, Bindi, thank you for all the physical and emotional support throughout. Without you this process may never have been finished. To my family for their continued involvement and support; on many occasions it was this persistence that kept the process going. Finally thank you to the numerous people who have had an input from an academic perspective, in particular Remco Polman for his guidance.

Thank you to all.

## CHAPTER 1 - INTRODUCTION

Within professional contact sports, injury has been reported frequently by athletes as causing stress (Anshel, 2001; Noblet & Gifford, 2002). Particularly within rugby union where injury has been reported as one of the top four stressors experienced by elite adolescent players (Nicholls & Polman, 2007), and the most frequent stressor by adult professional players (Nicholls Holt, Polman, & Bloomfield, 2006). A variety of coping strategies are utilized to manage these stressors, with the effectiveness varying per player (Nicholls et al., 2006). Although to date no research has found a causal relationship between injury as a source of stress and the actual incidence of injury such research suggest that injury can significantly increase the stress experienced by athletes. This is supported by the findings that following serious sports injury, elite athletes have reported this to be a stressful experience (Gould, Udry, Bridges, & Beck, 1997a) which is manifested by concerns related to career, physical rehabilitation, social interactions, further injury, and return to prior performance levels (Gould et al., 1997; Tracey, 2003).

### *1.1 ACL Injury*

Anterior cruciate ligament (ACL) rupture is an incapacitating knee injury that occurs frequently in sports performers (Webster, Feller, & Lambros, 2008). From initial injury to return to competition takes, on average, nine to twelve months rehabilitation (Shelbourne & Wilckens, 1990) However, more recently accelerated ACL rehabilitation protocols have been employed, aimed at returning athletes to sport within a six month period (Shaw, 2002). From a medical or physical perspective accelerated programs are believed to be more effective for younger adults, but have been associated with an increase in the possibility of further injury in the future (Mendonza, Patel, & Bassett, 2007). There are no set criteria established for return, however all stages of the ACL rehabilitation protocol should be successfully completed before return to competition



(Kvist, 2004). Of primary concern is re-injury of the ACL or to other related structures (i.e. menisci, cartilage, other ligaments), with re-injury rates ranging between 2.3% and 13% (Myklebust & Bahr, 2005). Kvist (2004) recommends that a completed rehabilitation with adequate muscle strength, joint movement, and functional knee stability be achieved before return to competition.

### *1.2 Psychology of Injury Rehabilitation*

Despite the extensive discussions related to the medical or physical aspects following ACL reconstruction, only limited attention has been paid to the psychological components associated with the rehabilitation process. How an athlete deals with such an injury can have dramatic consequences for their return to competition or continuation in sport. Over the last decade research on the psychological aspects of injury has largely concentrated on specific psychosocial factors which might influence the rehabilitation process. This has included research on social support (Bianco, 2001); self-confidence (Magyar & Duda, 2001); coping (Albinson & Petrie, 2003); psychological skills (Cupal & Brewer, 2001); emotional responses (Tracey, 2003); and anxiety of return to competition (Webster, Feller, & Lambros, 2008). Not surprisingly, Kvist, Ek, Sporrstedt and Good (2005) recently called for an increased focus on the psychological factors to assist athletes returning to competition following ACL injury.

Further, relatively little research investigating the psychological factors of injury rehabilitation have been conducted with professional athletes, with even less in relation to ACL rehabilitation. Andersen (2001) noted that in general professional athletes are highly dedicated to sporting commitments and as a result their injury experience may be significantly different to recreational athletes. Additionally, the majority of those studies which have investigated the psychological factors of injury rehabilitation have not been conducted concurrently with the occurrence, rehabilitation and return to competition,

and as such may be limited by the retrospective nature of their design (Brewer, Van Raalte & Linder, 1993).

Injured professional rugby union players are often removed from regular contact with the sports team within the early stages of their rehabilitation. As the rehabilitation progresses they usually form smaller rehabilitation training squads, comprising of players at various stages of rehabilitation. A treatment team (i.e., physiotherapist; fitness conditioner) are regularly designated to working with these athletes, with individual contact dependent on the size of the rehabilitation squad. As such developing the principles of self-determination (autonomy; competence; relatedness) could provide benefit for rehabilitation. When intrinsically motivated rehabilitation environments are created players can become more persistent within the rehabilitation, exhibit better adherence, and cope with rehabilitation stressors better (Niven, 2007).

### *1.3 Organization and aims of the present thesis*

Therefore, the overall purpose of this thesis was to investigate the psychological factors associated with ACL injury, rehabilitation and return to play experienced by professional rugby union players. A qualitative dominant mixed methodological procedure, combining semi-structured interviews, self-report diaries and six standardized questionnaires, was employed. Expanding on suggestions by Shelley (1999), five players described their emotional reactions and coping mechanisms during six distinct stages of the injury process: (1) Initial Injury – detailing the actual occurrence of the injury and the diagnosis of the severity of the injury; (2) Pre-Surgery – detailing the days leading up to the surgical reconstruction, including the actual surgery; (3) Post-Surgery – detailing the first few days following the reconstruction and the athlete's initial attempts to regain movement within the knee joint; (4) Early Limited Participation – detailing the early part of the rehabilitation program, where the emphasis

is on regaining the full range of movement in the knee joint and muscle strength; (5) Late Limited Participation – detailing the final part of the rehabilitation program, where emphasis is on more sport specific training and the final preparation for full fitness; (6) Return to Play – detailing the final training sessions before returning to competitive action and the first three games of competition after full rehabilitation.

This thesis is structured to offer a discussion of the previous research and its application to professional athletes. It then provides an overview of the methodological procedures, and discusses specific studies related to the stages of rehabilitation and influential components identified during the analysis of the data provided by each player.

The literature review provides a detailed overview of the main research associated with the psychological factors of injury as they pertain to professional athletes. Initially a synopsis of ACL injury and the incidence of ACL injury in rugby union are provided. The following sections describe important features associated with rehabilitation: psychological models of sport injury rehabilitation; coping with ACL injury; social support; surgery stage; motivating ACL rehabilitation; return to competition; limitations of previous research, and justification for the questionnaires utilized.

The methodology discusses the general methods utilized for data collection, with emphasis on the benefits of mixed methodological procedures. This chapter gives full demographic details of the participants, as well as discussion of the design of the semi-structured interview guides and diaries, and an explanation of the six standardized questionnaires used, with reference to the validity and reliability of each. Each study will discuss the specific methods and data analysis procedures that relate to the actual focus of each study.

Chapter 4 discusses the psychological effect of surgical intervention. The aim of this study was to identify the emotions and coping behaviours of the professional players' pre and post surgery.

Chapter 5 investigates the experiences of the players returning to competition following successful rehabilitation. The purpose of this study was to gain a greater understanding of the emotions and coping strategies utilized when returning to competition following ACL reconstruction.

Chapter 6 examines the facilitative nature of avoidance coping within injury rehabilitation, That is, this chapter investigated whether avoidance coping had both short term and long term benefits for injured players rehabilitation from ACL injury.

Chapter 7 considers the effects of self-determination theory (SDT) during the rehabilitation and return to competition phases. The aim was to discover how the three needs identified by SDT (autonomy; competence; relatedness) are experienced by injured professional rugby union players and to ascertain how these constructs assist their rehabilitation and subsequent return to play.

Chapter 8 is a case study of one player, who provided the most comprehensive information related to his injury, rehabilitation and return to competition. The aim was to investigate the emotions and coping responses throughout the six phases of rehabilitation.

Finally, the epilogue provides an overview of the findings of this research project and discusses its limitations and provides suggestions of areas for future investigation. The practical implications of the main findings are also considered.

## CHAPTER 2 – LITERATURE REVIEW

The review of the literature was established from a database search of peer-reviewed articles from Sport Discus, PsycINFO, Academic Search Complete, PsycArticles and Medline between 2004 and 2012.

### *2.1 ACL injury and rugby union*

Injury rates have increased significantly in rugby union over the last decade (Bathgate, Best, Craig, & Jamieson, 2002; Brooks, Fuller, Kemp, & Reddin, 2005). The incidence of injury in the professional game has been found to be 218 and 6.1 injuries per 1000 hours of competitive performance and practice respectively. Of these injuries 60% were to the lower limb and 41% were joint or ligament injuries that required on average 17 days rehabilitation (Brooks et al., 2005). The knee is the most commonly injured within rugby union (Nicholl, Coleman, & Williams, 1991), with ACL ligament injury being the most frequent (Myasaka, Daniel, & Stone, 1991). In addition to this Brooks et al. (2005) identified injury to the ACL as the most severe requiring an average 235 days rehabilitation.

### *2.2 ACL injury characteristics*

The ACL is the primary stabilizing ligament within the knee joint, and is also the most frequently injured structure within the knee (Perrin & Schultz, 2005), with tears most frequently occur during sports that require twisting, jumping, and pivoting. ACL injuries are most likely to occur in rugby union within the contact / tackle setting (Bathgate et al., 2002) or by non-contact mechanisms, such as changing direction, one foot stopping and landing (Boden, Dean, Feagin, & Garrett, 2000). Non-contact injuries occur when the foot is planted, the knee is flexed, and, as the player makes a sudden change in direction, a valgus force is applied to the knee with the lower leg in

external rotation, resulting in immediate disability. The same mechanism also occurs in contact injuries, such as those occurring when an athlete's foot is planted and is then hit on the posterolateral part of the knee (Shelbourne, Foulk, & Nitz, 1996). Peterson and Renström (2002) state that the ACL is the second strongest ligament in the knee and is designed to act as a stabilizer while allowing normal joint motion throughout the functional range of motion. ACL injury, in general, requires surgical intervention with a prolonged physical rehabilitation in order to return to pre-injury levels (Perrin & Shultz, 2005) and can have a dramatic effect on a professional player, including a whole season's competition missed, loss of potential earnings, or even an end to the sporting career (Bollen, 1998).

### *2.3 Psychological Models of Sport Injury Rehabilitation*

A range of negative emotions, principally shock, disbelief, anger, frustration and depression, have been reported by athletes following ACL injury (Morrey, Stuart, Smith & Wiese-Bjornstal, 1999). Over time these negative emotions are replaced by optimism and focus as the athlete concentrates on the rehabilitation process (Tracey, 2003). The quicker an athlete becomes disengaged from these negative emotions the sooner they can become focused on the physical rehabilitation (Grove & Gordon, 1995). As such early acceptance of the severity of the injury can result in a speedier and more efficient return to previous physical fitness levels (Bianco, Malo, & Orlick, 1999).

To assist understanding of the psychological processes experienced as a result of sports injury, both stage models (Kübler-Ross, 1969; Pedersen, 1986) and cognitive appraisal models (Brewer, 1994; Wiese-Bjornstal, Smith, Shaffer, & Morrey, 1998) have been provided. Because of the loss of health, sense of purpose, and self-identity initial research suggested the response to athletic injury was similar to the grief responses of terminally ill patients (Evans & Hardy, 1995; Rotella & Heyman, 1993).

According to Kubler-Ross (1969) this grief response involves five stages: (1) Denial – “I don’t believe or accept that this is happening to me”, may want to train on or refuse to accept; (2) Bargaining – “I want a rehabilitation program that will get me back quickly and if possible without me having to do too much or having to miss or modify my training”; (3) Anger – taken out on others or on oneself, may involve self punishment, rapid mood changes; (4) Depression – to feel sorry for oneself, reduced motivation to stick to rehabilitation, even substance abuse; and (5) Acceptance – reality sets in, signs of improvement adherence to the rehabilitation and alternative training programs. McDonald and Hardy (1990) examined emotional response patterns of severely injured athletes, suggesting many athletes actually pass through a succession of responses according to the seriousness of the actual injury or the relationship of the injury to the athlete’s competition schedule.

A similar three stage model has been proposed by Averill (1968): (1) Shock and disbelief; (2) Despondency and depression; and (3) Recovery. However, the sports injury rehabilitation literature has dismissed grief models suggesting they are: (a) formed from an incomparable population (Brewer, 1994); (b) inability to account for the idiosyncratic nature of emotional responses to injury (Smith, Scott, O’Fallon, & Young, 1990); (c) fail to recognize the impact of denial (Quackenbush & Crossman, 1994); and (d) allow no flexibility within the sequential nature of each stage (Brewer, 1994). However, a number of studies have found similar emotional responses to those reported in the grief response model (Tracey, 2003). As such Kübler-Ross’s (1975) notion of utilizing grief models in a flexible manner, could allow those involved with the rehabilitation an insight in a patient’s behaviour.

An alternative model to these stage models is the “Affective Cycle of Injury” (Heil, 1993; see Appendix 1). The fundamental assumption of this model is that movement through stages is not a one-time, linear process but is a cycle that may repeat

itself. The affective cycle of injury model retains three important ideas from the initial work of Kübler-Ross (1969) and Rotella (1982)<sup>1</sup>: (1) The dynamic transformational nature of emotional experience; (2) The patient's active 'work of recovery'; and (3) The importance of denial. Heil's (1993) model aims to demonstrate how distress, denial and determined coping interact within injury rehabilitation. He states that the distress associated with injury has a disrupting and disorganizing impact causing emotional instability including shock, anger, bargaining, anxiety, depression, isolation, guilt, humiliation, preoccupation, and helplessness. Denial includes the sense of disbelief and an inability to accept the severity of injury. Denial may be reflected in the athlete's attempts to assure significant others with plans to quickly return to training, competition and top form. Determined coping implies acceptance (to varying degrees) of the severity of injury and its impact on the athlete's short-term and long-term goals. It is characterized by the use of active coping through the process of recovery. The goal of the model is to help the injured athlete progress through denial and distress to determined coping.

Wiese-Bjornstal et al. (1998) presented an integrated model of the psychological response to sports injury (see Appendix 2), which illustrated the multitude of cyclical factors involved in development of cognitive appraisal and adjustment to being injured. Specifically, personal factors (i.e., age; level of competition) and situational factors (i.e., injury severity; timing of injury, availability of medical support) interact to influence the athlete's appraisal of injury, which influences emotional, behavioural, and cognitive responses. Cognitive appraisal, incorporating both personal and situational factors, is influential to emotions and behaviours related to sports injury (Gallagher & Gardner, 2007). Both primary (i.e., an assessment of what is at stake) and secondary appraisal

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<sup>1</sup> Rotella (1982) found rational and irrational fears may decrease rehabilitation focus, which may lead to re-injury or injury of another body part. Further Rotella suggests systematic desensitization may be used to manage anxieties related to the injury.



(i.e., assessment of coping resources) do fluctuate dependent on personal and situation factors of each injured athlete (Tracey, 2003). However, there are significant relationships between primary and secondary appraisals and the use of coping strategies (Albinson & Petrie, 2003).

Cognitive appraisal models provide an important framework for assessing athlete response to injury (Evans & Hardy, 1999). The benefit of such models is the ability to account for individual differences in responses (Granito, 2001). Research continually attempts to critique each theory against the other; however integrating different approaches may be of benefit for investigating athlete response to injury (Striegel, Hedgpeth & Sowa, 1996). Striegel et al. (1996) proposed a three level model incorporating cognitive appraisal into the first two stages (1 - short-term rehabilitation; and 2 – long-term rehabilitation), with Kübler-Ross's grief model incorporated in stage three (withdrawal from sport). A number of similarities exist between grief and cognitive appraisal models (Evans & Hardy, 1999) with the individual's perception of the situation being central. Further research is required to ascertain the impact of conjoining the models, with some suggestion that Lazarus and Folkman's (1984) 'Psychological Model of Injury Response' being the most appropriate. The model suggests that grief-like responses may be appraised by the injured individual; however each appraisal will be formed from idiosyncratic perspectives. As such grief-like responses may not be maladaptive, but rather identify athletes requiring more assistance to deal with the injury (Evans & Hardy, 1999). This perspective has also consequences for future research. Hence, it suggests investigating idiographic responses over time and situations.

#### *2.4 Coping with ACL Injury*

Coping is a dynamic and recursive process aimed at controlling stressful situations and has been defined as “constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (Lazarus & Folkman, 1984, p.141). Lazarus and Folkman’s (1984) transactional model of coping (see Appendix 3) suggests environmental demands and an individual’s perceived capability to respond combine to determine coping strategies. Simply, a person’s appraisal of stress will influence the quality and intensity of the emotional reaction in specific situations (Stephens & Vögele, 1986). As such, Lazarus and Folkman (1984) note that cognitive appraisal of a stressor involves both primary and secondary appraisals. Primary appraisals evaluate the impact of the event on the individual’s physical and psychological well being. If the primary appraisal is perceived to be harmful, a threat, a benefit or a challenge the individual will engage in a secondary appraisal (Lazarus, 1999). Within the secondary appraisal an individual assesses their coping options and analyzes which option will minimize the harm or maximize favorable outcomes (Lazarus & Folkman, 1984). Following secondary appraisal the transactional model identifies the next stage to be the actual implementation of the coping responses. The final stage of the model relates to emotions. Emotions are integral to the coping process and will allow for reappraisals during the event (Folkman & Moskowitz, 2004).

Alternatively a trait perspective of coping has been identified (Anshel, Jamieson, & Raviv, 2001), suggesting coping behaviours are a result of innate personality traits and are stable across stressful events and time. Similarly situational-based approaches suggest that environmental factors determine coping behaviours (Aldwin, 2007). However, both these theories have received only limited support in the literature.

Coping strategies can be categorized into three higher order dimensions (Lazarus & Folkman, 1984; Krohne, 1993). Problem-focused coping (PFC) describes strategies

used to minimize distress by reducing or eliminating the stressor. These strategies include: problem solving; planning; increasing effort; time management; goal setting; and seeking information (Lazarus, 1999). Emotion-focused coping (EFC) involves strategies used to regulate emotional arousal and distress (relaxation; acceptance; seeking social support; wishful thinking), whereas avoidance coping includes behavioural and psychological efforts to disengage from a stressful event. The athlete's appraisal can dictate the coping response. For example the goodness of fit hypothesis predicts that in situations of high perceived control PFC strategies would be more effective and in situations of low perceived control EFC strategies are preferential. Avoidance coping has been shown to have a negative effect (Ntoumanis & Biddle, 1998) and the majority of literature suggests avoidance coping is a maladaptive strategy in the long term (Kim & Duda, 2003).

Folkman and Moskowitz (2004) noted some forms of coping will be more effective for improving well-being. Being psychologically ready by utilizing both PFC and EFC strategies facilitates both surgical intervention (Udry, Shelbourne, & Gray, 2003) and return to competition (Podlog & Eklund, 2006). As suggested previously, PFC is preferable when a person has a high level of control over the situation and the outcome is a long term process (Roth & Cohen, 1986). Providing detailed information and control over the rehabilitation process can facilitate more effective coping (Miller, Combs, & Stoddard, 1989). Similarly, PFC strategies, principally instrumental coping, are the most employed by injured athletes (Udry, 1997). Anshel and Anderson (2002: p. 195) noted PFC strategies to be preferred when: (a) a person seeks situation relevant input; (b) action is required; (c) the source of the stress is known; and (d) the athlete is self-confident and has good communication skills. PFC within injury rehabilitation, specifically information gathering, could facilitate the rehabilitation process by allowing

the injured athlete to become better informed and as such prevent any further problems (Udry, 1997).

EFC is most advantageous when a situation is not changeable and there is a need for the athlete to accept the injury (Kerr & Miller, 2001). EFC reduces the impact of distress by maintaining hope and optimism and denying the impact of the situation (Lazarus & Folkman, 1984). Utilizing EFC strategies appears to reduce negative emotional disturbance and can control catastrophizing by the injured athlete, particularly following ACL surgery (Tripp, Stanish, Reardon, Coady, & Sullivan, 2003). Further Gould, Udry, Bridges and Beck (1997b) identified EFC strategies to be the third largest general dimension by athletes who have suffered a season ending injury.

Avoidance coping has been a regularly used coping strategy by athletes to deal with acute stress during sport participation (Nicholls et al., 2006) as well as to deal with stress during the early stages of retirement from sport (Sinclair & Orlick, 1993). Within general health psychology avoidance coping appears to increase levels of distress experienced during rehabilitation (Stanton & Snider, 1993; Blalock & Joiner, 2000), reduce resistance to disease and immunocompetence (Suls & Fletcher, 1985), prolonged cardiovascular reactivity (Vitalino, Russo, Bailey, Young, & McCann, 1993), and increased negative affectivity (Ingledrew, Hardy, & Cooper, 1997). Brown (2005) even proposed that avoidance coping strategies may inhibit rehabilitation from sports injury. A reciprocal relationship has been found between avoidance coping and less active coping strategies (Albinson & Petrie, 2003), suggesting a reduced chance of the athlete managing the injury effectively, increased time in rehabilitation, and an inability to return to previous performance levels can be experienced as a result of using avoidance coping strategies. However, Gould et al. (1997b) found that distraction coping was regularly utilized by severely injured athletes, with distraction coping allowing athletes

to engage in more pleasant activities, avoid feeling helpless and reduced self-esteem (Hatzigeoriadis, 2006).

Little is known about the coping strategies used by professional athletes or the effectiveness of such strategies during injury rehabilitation. Therefore, the assessment of coping by professional athletes during injury rehabilitation is an important aspect. Previous attempts to analyze these strategies have been limited by retrospective research designs (Brewer et al., 1993), which could be up to two years after the event. Further the majority of studies investigating coping in sports injury settings have employed quantitative approaches, with little consideration to the actual processes utilized. Therefore, this thesis uses both qualitative and quantitative methods at regular intervals concurrent with each player's rehabilitation.

### *2.5 Social support*

In general social support refers to the function and quality of social relationships (Schwarzer & Knoll, 2007) and has been defined as “an exchange of resources between at two or more individuals perceived by the provider or recipient to be intended to enhance the well-being of the recipient” (Shumaker & Brownell, 1984: p13). Simply it is the provision of resources by others to assist coping (Schwarzer, Knoll, & Riekmann, 2004). The right type, amount and timing of support is essential for increasing the success of the support provided (Udry, 1997). The types of social support have been acknowledged in sports injury rehabilitation literature to include (Hardy, Burke, & Crace, 1999): (a) emotional support – providing reassurance and empathy; (b) informational support – including task appreciation, task challenge and reality confirmation; and (c) tangible support – providing material and personal assistance.

Recently the social support literature has discussed the distinctions between perceived available support and the support actually received (Schwarzer & Knoll,

2007). Perceived available support can facilitate positive appraisal of injury rehabilitation (Rees, 2007). Having high levels of perceived availability of support combines favorably with the cognitive appraisal of stress (Schwarzer & Knoll, 2007), and is suggested to be a stable personality trait based on optimism (Sarason, Levine, Basham & Sarason, 1983). Perceived support focuses on the need for and availability of social support (Sarason, Sarason & Pierce, 1990) and within general health psychology is positively correlated to good adjustment from illness (Söllner et al., 1999). Perceptions of social support can fluctuate during the rehabilitation (Mitchell, 2011), with injured athletes believing they need more support in certain areas at specific times (i.e., family support could be most needed to control emotions prior to surgery, while the coach providing task support may be required prior to return to competition). Further the benefits of perceived social support is context specific (Levy, Polman, Nicholls, & Marchant, 2009), with the perception of support provided by medical staff most beneficial to the actual physical rehabilitation. While believing there are family and friends for support is of greatest benefit for emotional and practical support (Khan et al., 2009). Over the course of rehabilitation from ACL injury the desired support changes, with family and friends providing emotional and practical support decreasing over time and informational support provided by the physiotherapist and trainer preferred as rehabilitation progresses (Johnston & Carroll, 1998). Obviously the aim is to match the perceived demands with the actual support provided to facilitate rehabilitation. The lower the discrepancy between required and provided social support the greater the satisfaction with the support (Bianco, 2001).

The actual provision of social support plays a key role in coping with stressful situations (Mitchell, 2011; Schwarzer & Knoll, 2007) and is a popular coping strategy for injured athletes (Corban, Snape, & Taylor, 2003). The more support available benefits the coping process as it provides more coping resources to the injured athlete

(Luszczynska, Mohamed & Schwarzer, 2005). Rees (2007) suggests that received social support can encourage the selection of beneficial coping mechanisms. Medical staff and trainers are important for providing accurate information about the rehabilitation and tangible assistance (such as providing a knee brace, booking visits to the surgeon, or performing tests; Bricker-Bone & Fry, 2006; Williams & Newcomer Appaneal, 2010); teammates can be used as role models and a source of emotional support (Corbillion, Crossman & Jamieson, 2008); the coaching team can encourage and support, make the athlete still feel involved, and set goals for return to competition (Podlog & Dionigi, 2010; Podlog & Eklund, 2006); and friends and family allow for emotional distraction and strengthen efficacy beliefs (Khan, Iida, Stephens, Fekete, Druley, & Greene, 2009).

Another aim of social support is to increase self-efficacy (Schwarzer & Knoll, 2007), by increasing self-regulation and encouraging engagement in vicarious experiences in dealing with the stressor. Further Haslam, Pakenham and Smith (2006) found greater emotional support can facilitate feelings of self-efficacy. Bandura (1982) suggests self-efficacy can be developed by: (a) performance accomplishments; (b) vicarious experience, (c) verbal persuasion; and (d) emotional arousal. Social support within ACL rehabilitation settings could utilize the components of vicarious experience (i.e., seeing others do it; identifying role models) and verbal persuasion (providing feedback and encouragement) to facilitate the sport injury rehabilitation process.

It is important to note that social support could also inhibit rehabilitation (Johnston & Carroll, 1998; Udry, 1997). Clark and Stephens (1996) discussed the concept of problematic support that suggests individual support providers can be insensitive, by minimizing the stressfulness, criticizing coping efforts, or by providing unwanted advice. Problematic support can also reduce self-efficacy (Manne & Glassman, 2000). The support offered from medical providers could greatly impact the

positive or negative response of the injured athlete with inappropriate support being particularly detrimental (Johnston & Carroll, 1998).

On the whole, it suggests that social support is an important factor in injury rehabilitation and should therefore be assessed, preferably at different points in the rehabilitation process.

### *2.6 Stages of Sport Injury Rehabilitation*

Different distinct stages can be identified within the sport injury rehabilitation process. Below the pertinent psychological factors associated with ACL rehabilitation during the surgery, rehabilitation, and return to competition stages are discussed. In particular, the ‘surgery stage’ will highlight the emotions experienced and coping strategies utilized pre- and post-surgery. ‘Motivating ACL rehabilitation’ depicts both the early limited participation stage, where emphasis is on regaining strength and range of movement in the injured knee joint, and the late limited participation stage, where more sport specific training is undertaken. Thirdly ‘return to competition’ covers the final stages of game preparation and the first few competitive experiences.

### *2.7 Surgery stage*

Surgery can be extremely stressful for injured athletes. An important reason for this is that athletes experience a reduction in their physical ability. Such reductions in physical capabilities have been associated with identity crisis (Granito, 2001). In addition, surgery has been associated with fear of dying, anesthesia, and pain. Finally, past experiences or negative anecdotes from friends or family might cause stress at this stage of the injury rehabilitation process (Garbee & Gentry, 2001). Problem focused coping strategies are the most employed by injured athletes requiring surgical intervention (Udry, 1997). In particular, athletes attempt to alleviate the source of stress



through finding out more information and discussions with health care providers. Such information gathering allows the athlete to gain control over their rehabilitation (Kerr & Millar, 2001) and increase adaptive coping (Ridgeway & Matthews, 1982), which can help preparation for surgery. Ninedek and Kolt (2000) suggest athletes with a better understanding of the surgical intervention and rehabilitation will utilize more effective coping strategies. Within general health psychology increased personal control (i.e., being involved with the decision making process) has led to more adaptive coping responses being utilized (Heijmans, 1999) and gathering more information about the process has facilitated rehabilitation of athletes suffering musculoskeletal injury (Hagger, Chatzisarantis & Griffin, 2005).

The surgical intervention itself has consequences on the emotional response post surgery; specifically a perceived negative surgical experience has negative influence on emotions (Morrey et al., 1999). Following surgery athletes frequently experience negative emotions due to pain, decreased mobility and loss of independence (Johnson, 1997; Udry, 1997). Research suggests a fear of re-injury is common with athletes following ACL reconstruction (Mainwaring, 1999), with those experiencing increased anxiety prior to surgery being most vulnerable (Ray & Fitzgibbon, 1981). More recently Tracey (2003) noted athletes expressed relief as the most prominent emotion post surgery, with concerns related to loss of fitness, and loss of independence. Frustration of incapacity can be reduced by the athlete's acceptance of the injury (Bianco et al., 1999) and those involved with the rehabilitation process could benefit from discussing the injury in detail with the athlete. Prior injury experience could also assist coping post surgery, with those experiencing previous severe injury more likely to accept the seriousness of an ACL injury (Niven, 2007).

General health psychology literature has noted the benefit of social support for patients undergoing surgery (Stanton & Snider, 1993). Within sports injury rehabilitation

settings reduced depression, anger and anxiety (Albinson & Petrie, 2003), improved motivation (Gould et al., 1997a) and adherence to the rehabilitation protocol (Bianco, 2001) have been observed when support is readily available. Increased amounts of social support facilitate coping with the demands of rehabilitation (Green & Weinberg, 2001), but there is often limitations to its availability immediately following injury and after surgery (Heil, 1993). Medical staffs are ideally positioned to provide support for athletes requiring ACL reconstruction (Robbins & Rosenfeld, 2001), specifically by highlighting the importance of the rehabilitation and conducting open discussions with the injured athlete (Morrey et al., 1999). Connecting with other injured athletes is perceived as beneficial to coping with the injury and surgery (Granito, 2001). Injured athletes have frequently reported using other injured athletes as role models (Corbillion et al., 2008). Particularly, speaking with others in detail about the rehabilitation process has been found to be helpful (Gould et al., 1997b). The type of support provided may have a great affect on the athlete's emotional response to surgery (Niven, 2007). Lehman, Ellard and Wortman (1986) suggest that untrained individuals may try to minimize the impact of the injury, avoid communicating openly about the severity, criticize the athlete's attempts at coping, and give inappropriate advice.

### *2.8 Motivating ACL Rehabilitation*

As outlined previously a range of models have been suggested to assist understanding of the psychological impact of sports injury. However, self-determination theory (SDT) may provide an alternative that may be beneficial during rehabilitation from ACL reconstruction, by providing “a comprehensive perspective on the salient issues facing athletes returning to sport from injury” (Podlog & Eklund, 2007: p542). SDT has evolved from psychological research conducted over the last 30 years and focuses attention on the influence of social contexts on motivation, behaviour and

experience in particular situations. Self-determination is the degree to which people endorse their actions at the highest level of reflection and engage in the actions with a full sense of choice (Ryan & Deci, 2002). Simply SDT is a social-cognitive theory which tries to answer the why of behaviour (Ryan & Deci, 2000). The theory promotes an interactional view of motivation, where motivated behaviour results from personal and situational factors. The theory has been applied to many different life contexts including: education; interpersonal relationships; work; and sport and exercise.

SDT proposes that behaviour in any context can be categorized as being: (a) Intrinsically motivated – engaging in an activity for its own sake and without material rewards or the presence of external constraints; (b) Extrinsically motivated – engaging in an activity as a means to an end and not for its own sake; or (c) Amotivated – where there is a lack of behavioural intention and the absence of extrinsic or intrinsic motivation. Vallerand (2001) characterized intrinsic motivation as having three dimensions: to know; to accomplish; and to experience stimulation. SDT recognizes that different levels of extrinsic motivation exist (Ryan and Deci, 2002). Integrated regulation is the closest on the SDT continuum to intrinsic motivation, where the behaviour is performed out of choice but the choice is not limited to the activity itself but aims to harmonize different parts of the self (i.e. exercising as part of a healthy lifestyle). Identified regulation is where the behaviour is also performed out of choice however it is performed for external reasons (i.e. participating in sport to meet other people). Introjected regulation is behaviour as a result of internal pressure (i.e. guilt and anxiety to be in good shape). External regulation, which is what has traditionally been called extrinsic motivation, is where behaviour is a direct result of external reward and pressure or an attempt to gain external praise (i.e. taking part in sport for the prestige of being an athlete). The final part of the continuum, Amotivation has four established beliefs (Pelletier et al., 2001): (1) strategy belief – where the proposed strategy will not

bring desired outcomes (i.e. "exercising will not help me lose weight"); (2) effort belief – where the proposed behaviour is too demanding and one is not willing to invest the necessary effort; (3) ability belief – where there is a lack of belief in the ability to perform the specific behaviour; and (4) helplessness belief – with the belief that one's efforts have no effect whatsoever in achieving desired outcomes.

Vallerand (1997) proposed a hierarchical model of motivation as a method to study the motivational processes impacting persistence and well-being. The model suggests that the impact of social factors, such as success or failure and the coach's behaviour, will be mediated by autonomy (feeling free to choose one's own course of action), competence (interacting effectively with the environment), and relatedness (feeling connected to significant). Social factors which satisfy these needs will promote self-determined motivation. Different motivational types will lead to different cognitive, affective and behavioural outcomes, with the consequences decreasingly positive from intrinsic motivation to amotivation (Vallerand & Losier, 1999). Vallerand and Losier (1999) identified that self-determined types were related to positive emotions and high persistence in sport, while external regulation and amotivation have been related to negative emotions, low effort and low persistence.

The basic premise of SDT is that motivational states subsist along a self-determination continuum, ranging from intrinsic motivation (i.e., engaging in an activity for personal reasons) to amotivation (i.e., lack of behavioural intention), with an individual's positioning categorized by their needs for autonomy, competence and relatedness (Ryan & Deci, 2000). Autonomy is characterized by an internal locus of control and the perception that behaviours are self-regulated or personally endorsing (Podlog & Eklund, 2007a), competence is an individual's perception of proficiency in performance (Kilpatrick, Hebert, & Jacobsen, 2002), and relatedness provides a sense of belonging to a situation (Ryan & Deci, 2002). Increases in autonomous motivation have

lead to improved positive emotions (Vallerand & Losier, 1999), higher levels of persistence (Pelletier, Vallerand, Blais, & Vallerand, 1988) and increases in mental health (Frederick & Ryan, 1995). Podlog and Eklund (2007a) have suggested that the motivational climate experienced by the injured athlete will influence their rehabilitation behaviour, with an intrinsically motivated climate most likely to improve well being and health.

Within the early rehabilitation following ACL reconstruction, where emphasis is on developing range of movement and muscle strength, of principle importance is the athlete's need to understand and become personally connected to the rehabilitation process (Podlog & Eklund, 2005). Heijmans (1999) noted that personal control has led to increased use of adaptive coping strategies that facilitate the rehabilitation process, with specific benefits being identified when athletes have some control over the speed of the rehabilitation (Podlog & Eklund, 2007a; Podlog, Lochbaum & Stevens, 2010). Increases in self-regulation, particularly by gathering a wide range of information associated with the rehabilitation, have been shown to benefit adherence (Levy, Polman & Borkoles, 2008) and persistence (Pelletier et al., 1988). Taylor and Marlow (2001) suggest autonomy can be developed by significant others providing an autonomy supportive environment. Those involved in the rehabilitation can achieve this by initially establishing a relationship with the injured athlete, increasing their confidence in the rehabilitation team (Niven, 2007). Niven (2007) continued to suggest that the physiotherapist should "instil responsibility in the athlete so that they will become accountable for their rehabilitation behaviour" (p. 106). To encourage autonomy athletes should be allowed an input to the decision making process (Williams, Gagné, Ryan, & Deci, 2002). However, the restrictive nature of some ACL rehabilitation protocols could impact this by reducing athlete control over the rehabilitation.

Physical competence developments are also beneficial for the rehabilitating athlete (Evans, Hardy, & Fleming, 2000). Improvements in physical ability increase self-confidence and commitment to rehabilitation goals (Brewer et al., 2003). Athletes are increasingly likely to become engaged in the activity when there is a high level of self-confidence (Frederick & Ryan, 1995). However, concerns about physical competency are common with rehabilitating athletes (Tracey, 2003). Frustration can become a factor when athletes are unable to reach the set targets and again the impact of set ACL rehabilitation protocols may have an impact at this early stage of rehabilitation. In many cases these protocols are highly structured stating weekly training targets, allowing little flexibility for individual performers. In particular the social support provided during this stage of rehabilitation might help in problems associated with protocols (Podlog et al., 2010). Developing a good relationship with the therapist has been shown to be essential (Hagger et al., 2005), with medical staff being able to provide necessary information about the rehabilitation to the athlete. Similarly, injured athletes have used teammates who have rehabilitated from the same injury as a role model. Corbillion et al. (2008) noted that teammates are most regularly available to provide support to injured athletes.

Later in the injury rehabilitation process autonomy can be developed by utilizing PFC strategies. Athletes benefit from holding detailed discussions with medical care providers (Johnston & Carroll, 1998). Again, having opportunities to express themselves and input into the rehabilitation process can motivate the athlete during this phase, where emphasis is on regaining physical fitness levels and more sport specific training (Skinner & Edge, 2002). Hagger et al. (2005) noted control over the rehabilitation can reduce the impact of physical pain. Further, self-confidence is encouraged by achieving set training targets (Evans & Hardy, 2002). Goal setting has had an extensive amount of supporting literature within injury rehabilitation settings

(Evans & Hardy, 2002; Gilbourne & Taylor, 1998), with short term realistic goals facilitative to the development of competence and self-confidence (Podlog & Eklund, 2006). The restrictiveness of some ACL rehabilitation protocols again could have a major impact on this.

### *2.9 Return to Competition*

Despite the extensive discussions related to the medical or physical components of return to sport following ACL reconstructive surgery, specifically ensuring that all stages of the rehabilitation protocol are successfully completed (Kvist, 2004), only minimal investigation has been paid to the psychological aspects. Not surprisingly, Kvist et al. (2005) recently called for an increased focus on the psychological factors to assist returning to sport following ACL injury.

The 'Stages of Return to Sport' model was proposed by Taylor and Taylor (1997; see Appendix 4) to consider the process between rehabilitation to full participation in sport. This is a five stage model, with the severity of the injury, length of time in rehabilitation, and physical and psychological responses determining the time spent in each phase. (1) *Initial Return* – comprising of physical testing of the injured body part to determine the success of the rehabilitation; (2) *Recovery Confirmation* – the development of confidence by the injured athlete, as a result of the initial return testing; (3) *Return of Physical and Technical Abilities* – re-establishing physical condition and preparation for performance; (4) *High Intensity Training* – including the final testing of all physical and sport specific parameters; (5) *Return to Competition* – performance in a game situation. Having knowledge of the various stages of return to sport may make the process more manageable (Taylor & Taylor, 1997). Further, Taylor and Taylor (1997) suggest an amalgamation of both positive and negative emotions can be experienced by athletes returning to sport, and as such medical staffs are encouraged

to hold detailed discussions with the athlete regarding their concerns in order to facilitate a successful return to sport. Taylor and Taylor's (1997) model has had little empirical support and a number of limitations have been identified (Podlog & Eklund, 2007a). First, it is difficult to ascertain when the initial return phase commences or what is actually involved (Podlog & Eklund, 2007a). Further, Eklund and Bianco (2004) observed there is no acknowledgement of individuality regarding the speed of progression through the stages, while Brewer (2001) found no support for the notion of a sequential progression through the stages. Finally, Podlog and Eklund (2007a) suggested the model does not account for the actual experiences of athletes returning to sport.

As a result Brewer, Andersen and Van Raalte (2002) put forward a biopsychosocial model (see Appendix 5), containing seven components to help understand return to sport following injury. These are: characteristics of the injury; sociodemographic factors; biological factors; psychological factors; social / contextual factors; intermediate biopsychological outcomes; and sport injury rehabilitation outcomes. The basic premise of this model suggests the characteristics of the injury and the sociodemographic factors influence the biological, psychological and social / contextual factors. The relationship of these three factors will depict the intermediate biopsychological outcomes, which in turn will highlight the sport injury rehabilitation outcomes (Brewer et al., 2002). The model provides an overview of the numerous factors involved in return to competition, but it does not provide a comprehensive explanation of differing outcomes (Podlog & Eklund, 2007a). Further, the model encompasses the whole rehabilitation process from initial injury and is not specific to return to play. What is not debated however is that successful return to sport comprises of a range of physiological, psychological and social aspects (Andersen, 2001).



Kvist et al. (2005) noted that medical staff reported a lack of confidence in the injured knee by athletes returning to competition following ACL reconstruction. There are a number of factors which could explain reduced confidence including reduced physical ability (Johnston, 1997), a lack of autonomy (Podlog & Eklund, 2005), or inappropriate social support (Magyar & Duda, 2000). Increased physical competence, resulting in increased self-confidence or self-efficacy, can therefore facilitate an athlete's return to competition (Ryan & Deci, 2000). Evans et al. (2000) suggested gaining confidence in the injured body part and in general fitness is vital to the returning athlete. Similarly Webster et al. (2008) identified increased positive psychological responses lead to greater success when returning to competition. Utilizing an effective goal setting program has been shown to assist injury rehabilitation (Evans & Hardy, 2002), with the achievement of realistic goals enhancing self-confidence during the return to competition stage (Podlog & Eklund, 2006). Short-term goals can develop both physical and performance competence (Gilbourne & Taylor, 1998). Magyar and Duda (2000) noted athletes needed to overcome issues of low self-efficacy before they can successfully return to competition, and as such it is suggested that confidence training, concerned with internal factors (i.e., cognitive restricting; thought stopping; imagery), could benefit the rehabilitating athlete (Wagman & Khelifa, 1996).

Fear of re-injury has commonly been reported by athletes returning from serious injury (Bianco, 2001; Gould et al., 1997a; Heil, 1993). Mikkelsen, Werner and Eriksson (2000) reported that 7% of patients choose not to return to competition due to fear of re-injury. This fear of re-injury can affect confidence and reduce focus, while also affecting the physiological responses (Taylor & Taylor, 1997) and impact performance on return to competition (Mainwaring, 1999). Tracey (2003) recognized fear of re-injury to not just include worries related to the injured body part, but also concerns associated with lack of physical fitness and an inability to reach previous performance

levels. Further, failure to regain their position within a team could exasperate these emotions and increase self-doubt (Kvist et al., 2005; Podlog & Eklund, 2006). Fear of re-injury can be caused by incomplete rehabilitation, particularly associated with pressure to return quicker than physically ready (Taylor & Taylor, 1997). As such medical providers could allow the athlete greater autonomy and control over the rehabilitation process and ensuing optimal return to competition (Podlog & Eklund, 2007a). Further, PFC strategies, like confronting fear of re-injury, have been shown to facilitate effective return to competition (Kori, Miller, & Todd, 1990).

### *2.10 Limitations of Previous Research*

Although recently more research has been conducted investigating the psychological factors associated with injury, rehabilitation and return to competition, it is still limited. As suggested previously, the majority of research has been conducted using unidimensional, retrospective research designs. The major concern, as Brewer et al. (1991) suggest, is that retrospective approaches can be influenced by the event outcomes achieved by the athlete and this can lead to casual conclusions being made. Secondly, research has generally used only one research methodology (e.g., qualitatively or quantitatively). Further, much of this research was conducted with a specific focus (i.e., social support; self-confidence; coping; psychological skills; emotional responses; return to competition) and not considered the holistic psychological rehabilitation. Finally, the majority of research conducted to date has mainly been quantitative in nature with relatively little attention paid to possible underlying mechanisms. As such the present study adopted a mixed methodological approach in which athletes were followed during their injury rehabilitation.

### *2.11 Justification of Questionnaires*

Research has demonstrated athletic injury to have a high psychological impact (Johnston & Carroll, 1998). Injured athletes have greater negative affect (Leddy, Lambert & Ogles, 1994), lower self-esteem (Pearson & Jones, 1992), increased depression (Johnston & Carroll, 1998), and higher levels of anxiety (Tracey, 2003). How athletes respond emotionally to being injured might interfere with their rehabilitation. The Emotional Responses of Athletes to Injury Questionnaire (ERAIQ; Smith et al., 1990) was designed to assess injured athlete's psychological response to injury (Smith, Hartman & Detling, 2001), and has been commonly used within the literature to identify the emotional reactions athletes have to being injured. The ERAIQ was established from scores of clinical interviews with injured athletes and is integrated with Wiese-Bjornstal et al.'s (1998) model. This thesis utilized the ERAIQ during the initial interview with each athlete to enable a better understanding of each player's emotional state. Using the ERAIQ Smith et al. (1990) found severely injured athletes experienced more tension, depression and anger; while Smith (1996) used the ERAIQ to gain a greater insight into individual athlete's emotional responses in order to design specific interventions (i.e., positive self-talk; goal setting; relaxation) to aid rehabilitation. Morrey et al. (1999) noted ERAIQ responses related prominently to anger, frustration and boredom, and suggested that treatment teams can use the information to reinforce the importance of rehabilitation and emphasize progressions made. Utilizing the ERAIQ to assess pre and post surgery emotions, Gleeson, Parfitt, Minshull, Bailey and Rees (2008) identified frustration, helplessness, boredom, and optimism to be the primary emotions pre-surgery, with post-surgery emotions high in frustration, optimism, relief and boredom. This research suggests performers become less helpless, bored and angry as they progressed post-surgery.

A strong relationship has been identified between the level of pain and the physical / psychological responses (Meyers, Bourgeois, Stewart & LeUnes, 1992), with

athletes differing in their capacity to function with pain associated with injury. Strategies for coping with pain (i.e., distraction; ignoring pain) have been successful to encourage ability to function (Jensen & Karoly, 1991). The impact of pain experienced by injured athletes can inhibit their ability to adhere to and perform in rehabilitation. The revised Sports Inventory for Pain (SIP; Meyers, Bourgeois, LeUnas & Middendorf, 2003) was completed by each player following surgical intervention. The subscales (Direct Coping; Catastrophizing; and Somatic Awareness) provide an indication of the injured player's ability to cope with pain. Following surgery it is important to understand how players cope with pain, as this will provide greater detail into their response to surgery. The SIP is a sport specific measure developed to use with athletes, and is considered more psychometrically sound measurement of pain than other questionnaires (Levy, Polman, Clough, Marchant & Earle, 2006). The revised SIP has been successfully used to identify coping with pain response in collegiate athletes (Meyers, Bourgeois & LeUnes, 2001), BASE jumpers (Griffith, Hart, Goodling, Kessler & White, 2006), mental toughness (Levy et al., 2006), and clinical sports medicine settings (Wooten, Meyers, Fincher, O'Conner & Woods, 2002). Findings from the SIP suggest more experienced athletes who participated in high injury sports have more conservative pain coping skills than less experienced athletes (Griffith et al., 2006; Meyers et al., 2001).

Numerous scales are available to assess coping with injury (e.g., Coping Inventory for Stressful Situations, CISS, Endler & Parker, 1999; Ways of Coping Questionnaire, WCQ, Lazarus & Folkman, 1988). The Coping with Health Injuries and Problems (CHIP; Endler & Parker, 2000) was selected for the present study because it is specific to the rehabilitation context. It is "a unique integration of theoretical knowledge, empirical sophistication, and state-of-the-art psychometric techniques" (Endler & Parker, 2000: p.7). The four coping subscales of the CHIP (distraction;

palliative; instrumental; emotional preoccupation) are integral components of the coping literature. Endler and Parker (2000) found an injured elite speed skater to score high on the emotional preoccupation subscale and low on instrumental and distraction subscales. However, these scores could be innate personality dispositions of this athlete. Conversely, Udry (1997) found instrumental coping to be prevalent for athletes suffering ACL injury, with a desire by all to seek medical attention. Udry's findings also noted that palliative coping strategies were most employed at the surgery stage and diminished over the rehabilitation, while emotional preoccupation and distraction coping had only minimal fluctuations throughout the rehabilitation. Further the CHIP provides normative values for both males and females and by age.

A number of instruments are available in the literature to assess social support. The present thesis used the MOS Social Support Survey (MOS-SSS; Sherbourne & Stewart, 1991) to assess four aspects of social support (emotional; tangible; affectionate; positive social interaction), which are important components within injury rehabilitation and understand the type and amount of support available is essential for considering how social support affects the sport injury rehabilitation process. The MOS-SSS focuses on perceived support available, which may be more important in facilitating the rehabilitation from injury. As previously discussed, the perceived need for social support varies throughout the rehabilitation process with injured athletes requiring support from different individuals at specific times. Therefore, utilizing the MOS-SSS allowed the player to identify all perceived support available and not limiting it to specific individuals, as some other social support questionnaires do. Further, the questionnaire has good psychometric properties (McDowell, 2006).

The three needs of SDT (autonomy; competence; relatedness) have recently been applied to the psychology of sports injury (Podlog & Eklund, 2007a). Principally, the notion that more intrinsically motivated rehabilitation climates will improve well

being and health and the motivational climate created will influence athlete rehabilitation in different ways (Podlog & Eklund, 2007a). Further, Hagger et al. (2005) suggested that further longitudinal research is required to understand the complexities of SDT within injury rehabilitation. This thesis identified aspects of SDT discussed by each player during their rehabilitation and utilized two questionnaires from the Perceived Autonomy-Supportive Climates questionnaires (Deci & Ryan, n.d.). Specifically the Sport Climate Questionnaire and the Injury Rehabilitation Questionnaire (which changed the word coach to physiotherapist) were employed to ascertain the climate created by the player's coach and physiotherapist. Deci and Ryan note that the wording of the questionnaire can be slightly adjusted to target the specific issue. This enabled this thesis to investigate the climate created by two specific individuals (the coach and physiotherapist) who had increased influence on the player's rehabilitation and return to competition. Perceived autonomy-supportive climates questionnaires have been utilized in a range of sporting and non-sporting contexts, including: injury adherence (Levy et al., 2008); physical activity (Chatzisarantis, Hagger & Smith, 2007); education (Black & Deci, 2000); smoking cessation (Williams et al., 2002); long-term medical regimens (Williams, Rodin, Ryan, Grolnick & Deci, 1998); and health care consultation (Parkin & Skinner, 2003).

As discussed during this literature review a vast range of other psychological factors can influence injury rehabilitation. This thesis elected not to quantitatively assess factors such as goal setting, psychological skills (i.e., imagery; relaxation) and athletic identity, due to the limitations of the questionnaires available in these areas. Studies investigating goal setting and / or psychological skills have primarily implemented interventions into the rehabilitation program, while athletic identity has been researched from a qualitative perspective.

## *2.12 Aims and objectives of the current research programme*

The aim of the present thesis is to build on the existing literature to provide a greater understanding into the psychological factors associated with sport injury rehabilitation in general and ACL rehabilitation in particular. The present thesis will do this in a sample of professional athletes, an area which has had minimal research attention to date. As such this thesis investigated professional rugby union player's cognitions, coping behaviour and emotions pre-surgery and post-surgery, during rehabilitation, and returning to competition.

The following themes were investigated:

1. The emotional responses and coping with surgery.
  - a. Predicted that PFC facilitates preparation for and recovery from surgical intervention by reducing negative emotional responses.
2. The psychological factors associated with return to competition.
  - a. Predicted that gaining confidence in the injured knee would alleviate fear of re-injury, with social support being influential for successful return.
3. The use of avoidance coping during injury rehabilitation.
  - a. Predicted that some avoidant coping strategies could minimize short term negative emotional experiences during rehabilitation.
4. Self-determined motivation during rehabilitation.
  - a. Predicted that high levels of the three needs of SDT (autonomy; competence; relatedness) can assist rehabilitation by encouraging the injured player to take ownership of their rehabilitation.

## CHAPTER 3 - METHODOLOGY

*3.1 Participants*

The participants in the present study were professional rugby union players who had suffered anterior cruciate ligament (ACL) injury which required surgical intervention. Players 1 and 2 were backrow forwards, player 3 a fly-half, and players 4 and 5 outside backs (centre / wing / fullback). Each player took between six and twelve months to return to play from the initial injury, with surgery completed within four weeks of the initial injury being diagnosed. Players 1, 2 and 5 had suffered serious injury previously, while players 3 and 4 were experiencing their first injury that required a lengthy rehabilitation. An overview of each player's demographics is provided in Table 1. The study had institutional ethical approval and prior to participation each participant completed informed consent.

Table 1 – Participant Demographics

<b>Player</b>	<b>Age</b>	<b>Position</b>	<b>Length of Time Prior to Surgery</b>	<b>Length of Rehabilitation</b>	<b>Suffered Previous Severe Injury</b>
1	23	Backrow Forward	4 weeks	11 months	Yes
2	27	Backrow Forward	3 weeks	6 months	Yes
3	27	Fly Half	2 weeks	8 months	No
4	18	Full Back / Wing	2 weeks	12 months	No
5	24	Centre	4 weeks	12 months	Yes

*3.2 Research Design*

The crucial aspect in justifying a mixed methodology is that the combination of methods focuses on the strengths of each single method. By using a combination of methods at various points in the research process, the researcher can build on the strength of each and minimise the weaknesses of a single method approach. A mixed-method can increase both the validity and the reliability of the data (Frechtling & Sharp,



1997). Within the current study quantitative analysis was utilised to complement the findings of qualitative methods. Similarly, quantitative analysis may confirm or disconfirm any apparent significant data that emerge from the study. Greene, Caracelli and Graham (1989) highlight five major purposes of mixed-method evaluation design:

1. *Triangulation* – tests the consistency of findings through different instruments. In this study the use of quantitative questionnaires to support the qualitative data obtained (from both interviews and diary entries). For example high scores on the CHIP distraction coping scale support the information provided during the interviews.
2. *Complementarily* – clarifies and illustrates results from one method with the use of another method. In this study the questionnaire data will support the information noted during the in-depth qualitative interviews. For example the MOS-SSS responses support the discussions on the emotional support received from teammates and family.
3. *Development* – results from one method shape subsequent methods or steps in the research process. The questionnaires will provide the framework for the future interviews during the present study. For example where the ERAIQ responses indicate that the injured player places most pressure on himself to return probing questions were established to identify the depth of this in following interviews.
4. *Initiation* – stimulates new research questions or challenges the results obtained through one method. Using the data gathered during each method of data collection will strengthen or challenge results from other methods. For example all information gathered on distraction coping lead to discussion on the facilitative nature of such a coping method.

5. *Expansion* – provides richness and detail to the study exploring specific features of each method. In this study the questionnaires selected will examine a range of different aspects known to be associated with injury rehabilitation. For example the creation of an autonomy supportive rehabilitation environment is examined from the SDT questionnaires.

The qualitative data collection (interviews and diary entries) of this study enabled the researcher to understand the research question of ‘what it means to athletes to be injured’ as they go through the psychological states experienced during the injury process.

The goal of in-depth interviews is to elicit rich, detailed material (Lofland & Lofland, 1995). In-depth interviews encourage the capturing of respondent’s perceptions in their own words (Mahoney, 1997). This allows the researcher to present the meaningfulness of the experiences from the respondent’s perspective. The advantages of using in-depth interviews are (Mahoney, 1997):

1. Usually yield the richest data, details and new insights
2. Permit face-to-face contact with respondents
3. Provide the opportunity to explore topics in more detail
4. Afford ability to experience the affective, as well as cognitive aspects of responses
5. Allow the interviewer to explain / help clarify questions, increasing the likelihood of useful responses
6. Allow the interviewer to be flexible in administering interviews to particular individuals or circumstances
7. Allow understanding of cognitive changes over time.

Some limitations do exist for purely qualitative (interview) approaches. Creswell (2002) noted that interviews: (1) provide indirect information filtered through the views

of the interviewee; (2) provide information in a designated place rather than in natural settings; (3) the researcher's presence may bias responses; and (4) people are not equally articulate and perceptive.

Diaries allow for a more extensive investigation (Nicholls et al., 2006) as they can reduce the time between the event and recall. Diary data collection methods provide information that may not be reported with other data collection methods (Reis, 1994). Further, the use of personal documents, such as diaries, enables the participant to provide detailed information relating to them personally that they may be unwilling to discuss in other forums (Fetterman, 1989). Three broad types of research goals can be achieved using diary designs (Bolger, Davis & Rafaeli, 2003): (1) obtaining reliable personal information; (2) obtaining estimates of change over time, as well as individual differences in such change; and (3) conducting a causal analysis of within-person changes and individual differences in these changes. The use of diaries can be limited by incomplete material being provided and the participant only recording discrete events, overlooking continuous changes in emotions and coping (Folkman & Moskowitz, 2004). Reis and Gable (2000) noted that participants may require specific training to understand the protocol, as well as needing to be committed and dedicated to the data collect procedures.

To combat some of the limitations of solely qualitative data, this thesis employed six standardized questionnaires aimed at increasing the trustworthiness of the qualitative data. Combining the data collection sources allows for greater validity of the results, while also improving the researcher's understanding of the findings (Frechtling & Sharp, 1997). Research conducted from a solely quantitative perspective can often ignore the idiosyncratic aspects of the injury experience, and cannot capture the richness, complexity and value of qualitative methods (McDonald & Hardy, 1990).

Further, the unique perceptions and perspectives of injured athletes has not been adequately or concurrently assessed (Shelley, 1999).

### *3.3 Questionnaires*

#### *3.3.1 Emotional Responses of Athletes to Injury Questionnaire*

The Emotional Responses of Athletes to Injury Questionnaire (ERAIQ; Smith et al., 1990) identifies athlete's emotional responses to injury and is used to assess the injured athlete's psychosocial response to injury (Smith et al., 2001) (see Appendix 6). Smith et al. (1990) states that the ERAIQ assists in the assessment of the injured athlete by utilizing open-ended questions that allow for probing into areas of interest in more depth. Although the ERAIQ does not have established psychometric properties, it was developed from scores of clinical interviews with injured athletes and is integrated with the Wiese-Bjornstal et al. (1998) model that identifies psychological and social dimensions related to sports injury (Smith et al., 2001). The ERAIQ initially asks general, important questions to establish a sense of trust between the researcher and the injured athlete before focusing on the athlete's emotional response to injury (Smith et al., 2001). The questionnaire then progresses through questions related to the athlete's emotional response to injury, perceived percentage of recovery, fear of re-injury, optimism, and knowledge of the prescribed rehabilitation exercises (Smith et al., 1990). Morrey (1997) found the ERAIQ has good convergent validity with the Incredibly Short Profile of Mood Scale. The ERAIQ is excellent for documenting athlete emotions following injury and has been extensively used in injury rehabilitation literature (Langford, Webster & Feller, 2009).

#### *3.3.2 Sport Inventory for Pain*

The original Sports Inventory for Pain (SIP) (Meyers et al., 1992) was a 25-item sport specific measure of how different athletes respond psychologically when in pain.

However, Bartholomew, Edwards, Brewer, Van Raalte and Linder (1998) using confirmatory factor analysis reported only marginal support for the SIP factor structure and suggested that revision of the SIP was necessary. As such, the original SIP along with 18 other carefully selected questions was assessed (Meyers et al., 2003). Exploratory factor analyses resulted in a 15-item SIP (see Appendix 7) with three factors: Direct Coping, Catastrophizing, and Somatic Awareness. The SIP has been shown satisfactory factorial structure. Confirmatory factor analysis provided support for the proposed measurement structure ( $CFI = .94$ ;  $RMSEA = .05$ )<sup>2</sup>. The inter-correlations between the scales were low indicating that the scales of the SIP are relatively independent. In addition the reliability of the instrument was satisfactory for 2 of the 3 factors (COP alpha = .89; CAT alpha = .76; SOM alpha = .54). The SOM factor did not yield a satisfactory internal consistency (alpha > .60). However, internal consistency is depended on the number of items in a factor. The SOM scale in this respect only consists of 3 items. However, an important aim of the scale was to develop a tool which could be used in applied situations. The authors therefore developed a scale which was as parsimonious as possible. Finally, there is some support for its predictive validity (Meyers et al., 2003).

LeUnes and Nation (2002), amongst others, noted the need for a sport specific measure to assess athletes' response to pain and the coping strategies utilized. Meyers et al. (2003) suggest that the revised SIP will have the ability to identify and predict an athlete's capacity to cope with pain, which may subsequently affect performance.

Although a number of other inventories exist to assess pain, the sport specific nature of the SIP provided the rational for the inclusion in the present study.

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<sup>2</sup> The following fit indices are most often used in the literature: Comparative fit index CFI (Bentler, 1990); Root mean square error of approximation RMSEA (Browne & Cudek, 1993). CFI values of .95 or above and RMSEA values of .06 or lower indicate good model fit when these statistics are taken together (Hu & Bentler, 1999). However, it should be noted that Vandenberg & Lance (2000) have suggested that cut-off values of .90 for the CFI, .08 for RMSEA are acceptable lower bounds of good model fit.

### 3.3.3 Coping with Health, Injuries and Problems

The Coping with Health, Injuries and Problems (CHIP; Endler & Parker, 2000) scale was developed for the use with individuals experiencing a diverse set of health problems (see Appendix 8). It was designed to address the methodological and psychometric limitations that were associated with the use of existing coping measures at the time (Endler & Parker, 2000). The CHIP is a 32-item, multidimensional measure of coping strategies that probes the following coping concepts: Distraction (8 items); Palliative (8 items); Instrumental (8 items); and Emotional Preoccupation (8 items). Endler and Parker (2000, p.2) provide a detailed description of the CHIP scale, stating that it is a unique integration of theoretical knowledge, empirical sophistication, and state-of-the-art psychometric techniques. Respondents are asked to rate each of the 32 items on a five point scale ranging from (1) “Not at all”, to (5) “Very much”. Internal reliability coefficients for males between the ages of 18 and 29 ( $n = 439$ ) were: Distraction (.79); Palliative (.81); Instrumental (.82); and Emotional Preoccupation (.83). In general, test-retest reliability for the various CHIP scales has been excellent (Endler & Parker, 2000). Endler, Courbasson and Fillion (1998) examined the stability of the CHIP with cancer patients, finding all subscales had a good test-retest reliability coefficient of: Distraction (.85); Palliative (.76); Instrumental (.79); and Emotional Preoccupation (.75), with male participants. CHIP results have demonstrated that the scales identify core features of coping with health problems in adults. Endler, Parker & Summerfeldt (1998) correlated the CHIP with the Marlowe-Crowne Social Desirability scale (MC, Crowne & Marlowe, 1964) finding the correlation between the Distraction Coping scale and the MC was  $.13$  ( $p > .05$ ) for men; the correlation between the Palliative Coping scale and the MC was  $.10$  ( $p > .05$ ) for men; the correlation between the Instrumental Coping scale and the MC was  $.15$  ( $p > .05$ ) for men; and the correlation between the Emotional Preoccupation Coping scale and the MC was  $-.21$

( $p > .05$ ) for men. The low overall magnitude of the correlations suggests that the CHIP is relatively free from the effects of social desirability (Endler et al., 1998).

A number of questionnaires exist to assess coping behaviour. However, the CHIP is the only one specific to injury rehabilitation. In addition, it has good psychometric properties and has been used previously in studies on injury rehabilitation. These were the main reasons why the CHIP was included to assess coping in the present study.

### *3.3.4 MOS Social Support Survey*

The MOS Social Support Survey (MOS-SSS; Sherbourne & Stewart, 1991) enables the identification of various forms of social support offered during rehabilitation. The survey was designed to provide a comprehensive overview of the various dimensions of social support. Multitrait scaling analysis supported the dimensionality of four functional support scales: Emotional / Informational (8 items); Tangible (4 items); Affectionate (3 items); and Positive Social Interaction (3 items); plus an additional item (“Someone to do things with to help get your mind off things”) (Sherbourne & Stewart, 1991). Correlations between the four subscales ranged from .69 - .82 (Sherbourne, Stewart & Wells, 1992). Each item is rated on a five point scale ranging from (1) “None of the time”, to (5) “All of the time”. The higher the average score, the greater amount of support available. Internal consistency was high for tangible support ( $\alpha = .91$ ), emotion/information support ( $\alpha = .96$ ), affection support ( $\alpha = .94$ ), positive social interaction ( $\alpha = .94$ ), and total support ( $\alpha = .93$ ). Baigi, Hildingh, Virldhall and Fridlund (2008), treating the MOS-SSS as an additive scale, reported a Cronbach’s coefficient alpha of .96.. There is also good evidence of test-retest reliability and stability over time, with 1-year repeat measures correlating with baseline in the .72 (emotional/informational support) to .78 (total support) range (Sherbourne & Stewart, 1991). Factor analysis confirmed that the 20 items could be fitted into an overall index,

and the four sub-scales were internally distinct from each other (Sherbourne & Stewart 1991). The MOS-SSS is widely used and considered to have high reliability and validity (Baigi et al., 2008). Further, the MOS-SSS showed significant correlations with loneliness ( $r = -.53$  to  $-.69$ ), marital and family functioning ( $.38 - .57$ ), and mental health ( $.36 - .45$ ). Discriminant correlations ranged from  $-.14$  to  $-.21$  with pain severity. This suggest that the MOS-SSS has good convergent and divergent validity A Chinese version of the MOS-SSS (Yu, Lee & Woo, 2004) was evaluated by correlations with the Multidimensional Perceived Social Support Survey ( $r = .82$ ) and the Hospital Anxiety and Depression Scale ( $r = -.58$ ).

Although there a number of other scales which assess social support, the present study included the MOS-SSS because of its good psychometric properties, the multidimensional assessment of social support, it has been used previously in injury rehabilitation, and because it is relatively quick to complete.

### *3.3.5 Perceived Autonomy*

The final two questionnaires were adapted from the Sport Climate Questionnaire (part of a group of questionnaires used to identify Perceived Autonomy-Supportive Climates; Deci & Ryan, n.d.), and investigated the climate established by the coach (Sport Climate Questionnaire; see Appendix 10) and by the physiotherapist (Injury Rehabilitation Questionnaire; which replaced the word ‘coach’ with ‘physiotherapist’; see Appendix 11) during the rehabilitation process. These questionnaires have 15 items with answers being scored on a scale of (1) “Strongly disagree”, to (7) “Strongly agree”. Scores are derived by averaging the item scores (item 13 has a reverse score), with higher scores indicating greater perceived autonomy support. The alpha coefficient of internal validity has been above .90 for this instrument (Deci & Ryan, n.d.). The authors note that the wording of the questions can be changed slightly to specify the particular situation being studied.



Perceived Autonomy-Supportive Climates questionnaires have been successfully utilized in a wide range of settings: weight loss (Patrick, 2004); medication adherence (Williams et al., 1998); nutrition (Pelletier, Dion, Slovinec-D'Angelo, & Reid, 2004); and retention (Duda, 2004). The questionnaires have been shown to have good reliability ranging between .81 (Pelletier, Fortier, Vallerand & Briere, 2001) and .96 (Williams et al., 1998).

There is currently no other questionnaire available which assesses perceptions of autonomy-support (using the SDT framework) in the rehabilitation context. Therefore, this questionnaire was selected for the present study.

### *3.4 Procedure*

This was a mixed methodological longitudinal investigation conducted concurrently with the athlete's injury rehabilitation. Following institutional approval, initial contact was made with the athlete prior to him undergoing reconstructive surgery and within two weeks of the anterior cruciate ligament injury being identified. On initial contact each player was informed of the purpose of the thesis study and completed informed consent detailing their involvement, the data collection procedures, and the use of the data collected (see Appendix 12). The methodological procedure was split into six distinct phases of the injury and subsequent rehabilitation, expanding on research conducted by Shelley (1999), to cover (1) Initial Injury – detailing the actual occurrence of the injury and the diagnosis of the severity of the injury; (2) Pre-Surgery – detailing the days leading up to the surgical reconstruction, including the actual surgery; (3) Post-Surgery – detailing the first few days following the reconstruction and the athlete's initial attempts to regain movement within the knee joint; (4) Early Limited Participation – detailing the early part of the rehabilitation program, where the emphasis is on regaining the full range of movement in the knee joint and muscle strength; (5)

Late Limited Participation – detailing the final part of the rehabilitation program, where emphasis is on more sport specific training and the final preparation for full fitness; (6) Return to Play – detailing the final training sessions before returning to competitive action and the first three games of competition after full rehabilitation.

A mixed methodological approach, principally combining qualitative and quantitative methods, was utilized for this study. This approach consisted of a dominant (qualitative) – less dominant (quantitative) design as suggested by Tashakkori and Teddle (1998). Each player was interviewed on a regular (every two / three weeks) basis, utilizing a semi-structured interview guide as suggested by Patton (1990), and utilized by Podlog and Eklund (2006), regarding thoughts, feelings, emotions, and coping strategies utilized during rehabilitation. An interview guide was established for each phase of the rehabilitation (see Appendix 13 for full interview guides), utilizing the vast range of current research on the subject (e.g., Albinson & Petrie, 2003; Gould et al., 1997b; Tracey, 2003) and the researchers' personal experience of ACL injury. Each interview on average lasted 30-45 minutes, with the dialogue audiotaped and transcribed verbatim producing on average 19 single-spaced pages of data.

Each player was also asked to complete a pre-designed, self-report diary (see Appendix 14), allowing him to record all day-to-day changes in emotional responses and state coping strategies utilized. Specifically, each player was instructed to consider the following points when completing the diary entries: (1) Changes in feelings towards injury and not being able to participate; (2) Things that you have done to cope; (3) The affect that any setbacks have; (4) Types of social support you have received; (5) Your relationship with the medical staff and rehabilitation team; (6) The affect the injury is having on your lifestyle; (7) General thoughts and feelings. Each player was instructed to record changes when they were experienced, and to answer the specific questions (i.e., what are your thoughts and feelings leading up to surgery?; how did you feel after

your first game back?) as close as possible to the occurrence. The diaries completed in paper format (n=1) were returned to the researcher following successful return to competition, while diaries completed electronically (n=4) were returned when specific phases were completed.

Each player completed six established questionnaires at specific times during the rehabilitation, to assist with the confirmation of any significant data that may emerge through the qualitative data collection methods. The Emotional Responses of Athletes to Injury Questionnaire (ERAIQ; Smith et al., 1990) was completed immediately after diagnosis of the severity of the injury. The ERAIQ identifies athlete's emotional responses to injury and is used to assess the injured athlete's psychosocial response to injury. Smith et al. (1990: p.23) states that "the ERAIQ is a blueprint for the comprehensive assessment of an injured athlete". The Sports Inventory for Pain (SIP) questionnaire (Meyers et al., 2003) was completed following the reconstructive surgery. The SIP is a 15-item sport specific measure of how different athletes respond psychologically when in pain. Answers on each item are then categorised into three groups (Direct Coping, Catastrophizing, and Somatic Awareness). The Coping with Health, Injuries, and Problems (CHIP) inventory (Endler & Parker, 2000) was completed in the early limited participation phase. The CHIP provides a score for four subscales related to coping (Distraction coping; Palliative coping; Instrumental coping; Emotional Preoccupation), which allowed for triangulation of utilized coping strategies discussed during the interviews. Following a successful return to competition each player was asked to complete the MOS Social Support Survey (MOS-SSS, Sherbourne & Stewart, 1991), which enabled the identification of various forms of social support (Emotional / Informational support; Tangible support; Affectionate support; Positive Social Interaction) offered during his rehabilitation. The final two questionnaires were both adapted forms of the Sport Climate Questionnaire (part of a group of

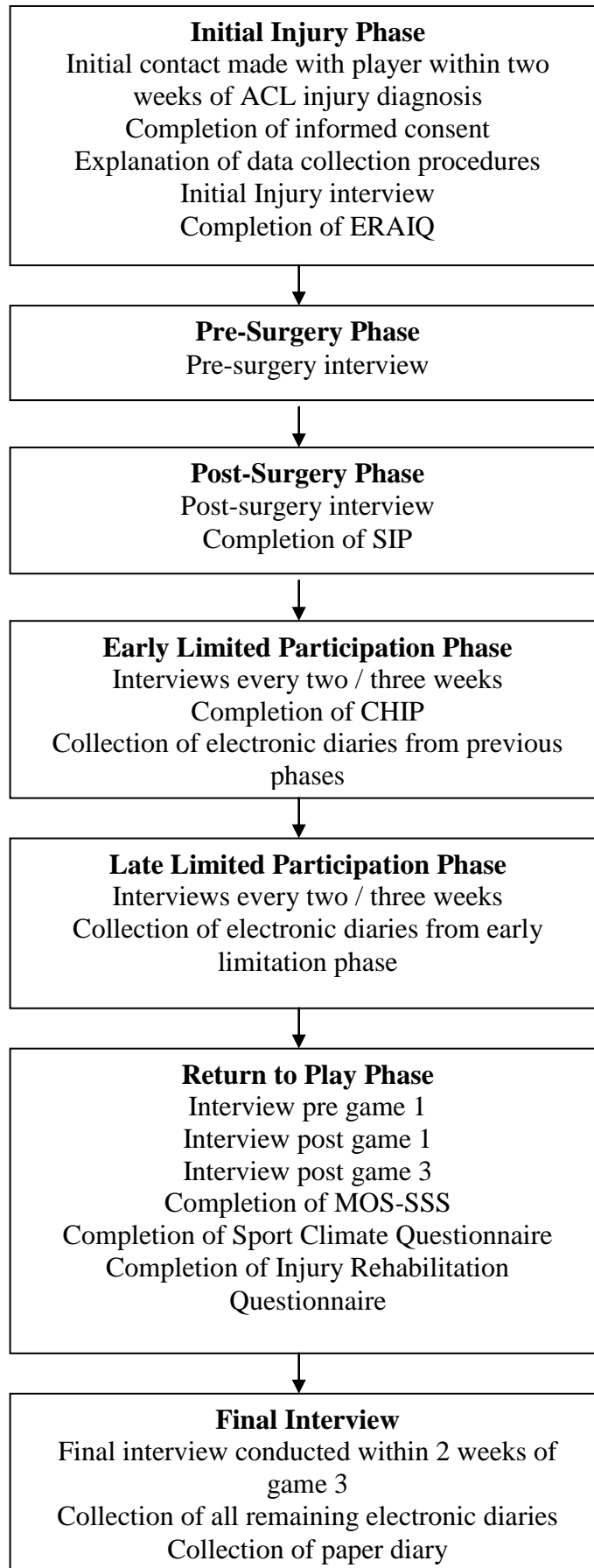
questionnaires used to identify Perceived Autonomy-Supportive Climates; Deci & Ryan, n.d.). These questionnaires are designed to assess to what degree the climate established is autonomous or controlling. The final two questionnaires, completed after full rehabilitation, investigated the climate established by the coach (Sport Climate Questionnaire) and by the physiotherapist (Injury Rehabilitation Questionnaire) during the rehabilitation process.

A hierarchical content analysis, as recommended by Patton (1990) was conducted on all qualitative data (interviews and diaries). Utilizing guidelines by Tesch (1990) a detailed examination of the data to identify topics that best describe particular segments of text was conducted, followed by a determination of common features that characterize the text segments in order to create and understand the relationship between topics. These topics were initially identified by the author before being reviewed by the thesis supervisor. There were a number of disagreements about the identified topics, most of which related to repetition of themes when data could have been collapsed into a single theme. Eventually, following extensive discussions, the final coding scheme was agreed upon. Each study had a unique content analysis procedure that is discussed in detail within the specific study.

No statistical analysis was completed on the quantitative data rather it was utilized to triangulate with the qualitative data to assist with the confirmation or rejection of the themes identified. Combining data sources allows for a more holistic view of the main factors and reduces the possibility of inaccurate interpretations of the qualitative data being attained (Frechtling & Sharp, 1997). This triangulation of different data sources increased the trustworthiness (Lincoln & Guba, 1985) of the analysis conducted. Creswell (2003) noted concurrent analysis of different data sources assists in building a dependable rationalization for the identified themes. Credibility was further developed by prolonged engagement, member checking, peer debriefing and

negative case analysis. Prolonged engagement, which allows the researcher an in-depth understanding of the phenomenon and enables tracking of specific aspects over time, was achieved by regularly interviewing each player throughout the rehabilitation and return to competition process. Member checking was utilized to determine the accuracy of the themes, by ensuring each player agreed with the identified themes. The process of peer debriefing enhanced the accuracy of the data, through consultation with an experienced researcher regarding methodological issues and data analysis issues during the course of the investigation. Negative case analysis, constantly examining themes which did not follow the general pattern of the players' discussions, added to the credibility of each account.

### 3.5 Time Line for Methodological Procedures



## CHAPTER 4 – STUDY 1

The Psychological Effects of Surgical Intervention on Injured Professional Rugby  
Union Players

Within the contact sport rugby union injuries are rather common. The incidence of injury in the professional game has been found to be 218 and 6.1 injuries per 1000 hours of competitive performance and practice respectively. Of these injuries 60% were to the lower limb and 41% were joint or ligament injuries that required on average 17 days rehabilitation (Brooks et al., 2005). In addition to this Brooks et al. (2005) identified injury to the anterior cruciate ligament (ACL) as the most severe requiring an average 235 days rehabilitation. The ACL is the primary stabilizing ligament within the knee joint, and is also the most frequently injured structure within the knee (Perrin & Schultz, 2005). ACL injuries are most likely to occur within the contact / tackle setting (Bathgate et al., 2002) or by non-contact mechanisms, such as changing direction, one foot stopping and landing (Boden et al., 2000). ACL injury, in general, requires surgical intervention with a prolonged physical rehabilitation in order to return to pre-injury levels (Perrin & Shultz, 2005).

Shock, disbelief, anger, frustration and depression, and other negative emotions have been reported by athletes following initial injury (Brewer, 2001; Johnston & Carroll, 1998; Tracey, 2003). These emotions are replaced by optimism and focus as the athlete concentrates on the rehabilitation process (Tracey, 2003). However, little information is available on the time course of these changes in emotions. This despite the notion that early acceptance of the severity of injury may result in a speedier and more efficient return to previous physical fitness levels (Bianco et al., 1999; Brewer, Linder & Phelps, 1995).

An integrated model detailing the psychological response to sports injury was provided by Wiese-Bjornstal et al. (1998) to depict the multitude of cyclical factors

involved in the development of an injured athlete's cognitive appraisal and adjustment to being injured. Cognitive appraisal, incorporating both personal and situational factors, is influential to emotions and behaviors related to sports injury (Gallagher & Gardner, 2007). Further, the importance of both primary and secondary appraisals on coping strategies employed have been discussed within the literature (Albinson & Petrie, 2003; Gallagher & Gardner, 2007; Tracey, 2003). Coping, in this respect, is a dynamic and recursive process aimed at controlling stressful situations (Lazarus & Folkman, 1984) and the strategies used have been classified in higher order dimensions. Approach coping refers to efforts to manage stressful situations (e.g. goal setting, planning, information gathering), while avoidance orientated coping focuses on cognitive or behavioral changes to avoid the stressor (e.g. blocking, removal from the situation) (Endler & Parker, 2000).

Both acute and severe stressors are experienced by patients requiring surgery and these affect the patient's rehabilitation (Losiak, 2001). The surgical intervention itself has consequences on the emotional response post-surgery; specifically a perceived negative surgical experience has negative influence on emotions (Morrey et al., 1999). The most frequently experienced negative emotions following surgery are related to pain, decreased mobility and a loss of independence (Udry, 1997). Losiak (2001) suggests a complex array of coping strategies are utilized to deal with these emotions.

Competitive athletes have been identified as having greater mood disturbance when surgical intervention is required (Pearson & Jones, 1992; Wiese-Bjornstal & Weiss, 1987). Increased levels of mood disturbance, distinctively fear, anger and anxiety, coupled with poor coping strategies will detrimentally influence physical rehabilitation immediately following surgery (Morrey et al., 1999; Ray & Fitzgibbon, 1981). As the emotional responses to injury and surgery influence the coping strategies utilized (Udry, 1997), it is suggested that providing more information and control will



facilitate more effective coping (Miller et al., 1989). Approach coping in general and instrumental (i.e. attempts to alleviate the source of stress through finding out more information and discussions with health care providers) coping in particular are the most employed strategies by injured athletes (Udry, 1997).

Within general health literature, Stanton and Snider (1993) found seeking social support facilitative to increasing positive emotions whereas in sports injury rehabilitation social support has been seen to reduce depression and anger (Albinson & Petrie, 2003), and improve motivation (Gould et al., 1997b) and adherence to the rehabilitation protocol (Bianco, 2001). Medical staff can provide support by highlighting the importance of the rehabilitation and discussing areas of concern experienced by injured athletes (Morrey et al., 1999). Injured athletes also use other injured athletes as models (Corbillion et al., 2008), and speaking with other previously injured athletes is also perceived to be helpful (Gould et al., 1997b).

On the other hand cognitive avoidance coping strategies appear to have a debilitating effect on rehabilitation, by increasing levels of distress (Stanton & Snider, 1993). Equally, the restrictive nature of some ACL rehabilitation protocols (Shelbourne & Nitz, 1990; Shelbourne & Rowdon, 1994; Shelbourne & Wilckens, 1990) could influence mood disturbance, predominantly increasing anger, frustration and boredom (Morrey et al., 1999). As a result health care providers are encouraged to reinforce the importance of the rehabilitation to assist in reducing the negative impact of the protocol (Morrey et al., 1999; Niven, 2007).

The severe stress associated with surgery has had extensive research in the general health literature. However, few studies have investigated the influence of surgery on professional sports performers' psyche, even though the psychological impact of such intervention may greatly affect the rehabilitation process. In addition to this, most research in this area has either been conducted by employing retrospective research

designs, with research utilizing longitudinal designs being primarily quantitative in nature. Expanding on current practice within sports injury research (i.e., Podlog & Eklund, 2006) a mixed methodological prolonged investigation concurrent with each player's rehabilitation was conducted. In particular, the present study investigated professional rugby union player's cognitions, coping behaviour and emotions pre-surgery and post-surgery (the first week following the operation and the initial attempts to regain movement in the knee joint). Specifically the following themes were investigated: (1) The emotional response pre and post surgical intervention; (2) The coping strategies utilized; and (3) The relationship between coping and emotions.

## Method

### *Participants*

Following institutional approval and completion of informed consent, a mixed methodological approach was undertaken with five professional rugby union players, who had suffered anterior cruciate ligament (ACL) injury that required surgical intervention. Table 1 presents full participants demographics.

Table 1 – Participant Demographics

<b>Player</b>	<b>Age</b>	<b>Position</b>	<b>Length of Time Prior to Surgery</b>	<b>Length of Rehabilitation</b>	<b>Suffered Previous Severe Injury</b>
1	23	Backrow Forward	4 weeks	11 months	Yes
2	27	Backrow Forward	3 weeks	6 months	Yes
3	27	Fly Half	2 weeks	8 months	No
4	18	Full Back	2 weeks	12 months	No
5	24	Centre	4 weeks	12 months	Yes

### *Procedure*

All players were contacted within two weeks of the initial diagnosis of ACL injury and informed of the purpose of the study. A mixed methodological approach was undertaken concurrent with each player's rehabilitation, consisting of an initial

interview, plus two further interviews, one prior to surgical intervention and one post surgery, in order to ascertain the cognitions, emotions and coping strategies experienced. Three distinct semi-structured interview guides (see Appendix 13), developed from a range of previous literature (e.g., Albinson & Petrie, 2003; Tracey, 2003), were employed to conduct each interview, with each interview lasting on average 30-45 minutes in duration. All players also completed a pre-designed self-report diary, allowing them to record day-to-day changes in their emotions and coping strategies. Each player was encouraged to complete this whenever they noticed emotional changes. Specifically each player was instructed to record both positive and negative emotional changes, and indicate the strategies utilized to cope, relating to both the injury and life in general. Diaries allow for a more extensive investigation (Nicholls et al., 2006) as they can reduce the time between the event and recall. In addition three standardized questionnaires were completed by each player, to assist with the triangulation of the data from the interview transcripts and diary entries. The Emotional Responses of Athletes to Injury Questionnaire (ERAIQ; Smith et al., 1990) was completed immediately after diagnosis of the severity of the injury. The ERAIQ assesses the injured player's psychosocial response to injury and provides "a blueprint for the comprehensive assessment of an injured athlete" (Smith et al., 1990: p.23). The Sports Inventory for Pain (SIP) questionnaire (Meyers et al., 2003) was completed following the reconstructive surgery. The revised 15 item SIP measures three factors concerning how athletes respond psychologically when in pain which includes direct coping, catastrophizing and somatic awareness. Items are rated on a 5 point likert scale anchored by 1 (*strongly disagree*) and 5 (*strongly agree*). Evidence regarding exploratory and confirmatory factor analysis for the revised SIP has been established by Meyers et al (2003). The Coping with Health, Injuries, and Problems (CHIP) inventory (Endler & Parker, 2000) was completed by the participants following surgery. This

instrument is a 32-item multidimensional measure of coping strategies in which ratings are outlined on a 5-point likert scale ranging from 1 (*not at all*) to 5 (*very much*). Coping strategies included in the CHIP are distraction coping, palliative coping, instrumental coping, and emotional preoccupation. Each of the scales has displayed good internal consistencies, alongside acceptable factorial validity using exploratory factor analysis (Endler & Parker, 2000).

#### *Data Analysis*

Each interview was audiotaped and transcribed verbatim and a hierarchal content analysis, as suggested by Patton (1990), was conducted on the transcripts and diary entries. Utilizing guidelines by Tesch (1990) a detailed examination of the data to identify topics that best describe particular segments of text was conducted, followed by a determination of common features that characterize the text segments in order to create and understand the relationship between topics. Specifically the following five-step process was applied: (1) All interviews and diary entries were read and reread to allow the analyzer to obtain familiarity with them; (2) Significant statements and phrases that directly related to cognitions, emotions and coping were extracted; (3) These significant statements were arranged with like terms to form raw data themes for each phase; (4) These raw data themes were then integrated into higher order themes by which the experience was described; (5) Ultimately, all higher order themes from each player were compared, in order to examine the common themes endured. These common themes are of the greatest generality, meaning that no links could be uncovered among these themes.

No specific quantitative analysis was conducted on the questionnaire response, but this information was triangulated with the qualitative data in order to approve or reject the specific themes identified. Frechtling and Sharp (1997) suggested the combination of data collection methods, as such, improve the validity and reliability of

the data, by providing a holistic synopsis of each player's perceptions. Creswell (2003) found increased accuracy of interpretations of qualitative data by utilizing this form of mixed methodological approach. Trustworthiness (Lincoln & Guba, 1985) was established predominantly by this triangulation of data sources. Creswell (2003) noted concurrent analysis of different data sources assists building a dependable rationalization for the identified themes. Credibility was further developed by prolonged engagement, member checking, peer debriefing and negative case analysis.

### Results and Discussion

Content analysis was conducted on both the pre-surgery and post-surgery data, and coalesced into the general dimensions of Approach Coping, Avoidance Coping, Negative Emotions or Positive Emotions. Pre-surgery analysis identified 11 higher-order themes, with *instrumental coping*, *social support*, *future planning*, and *focused on physical rehabilitation* forming Approach Coping; *blocking* and *behavioural avoidance* comprising Avoidance Coping; *shock*, *depression* and *anxiety* forming Negative Emotions; and *acceptance* and *relief* developing Positive Emotions (see Figure 1).

Post-surgery analysis classified 10 higher-order themes. Again the higher-order themes *instrumental coping*, *social support*, *future planning* and *focused on physical rehabilitation* composing Approach Coping; *blocking* and *behavioural avoidance* coalescing Avoidance Coping; *frustration* and *anxiety* forming Negative Emotions; and *relief* and *acceptance* forming Positive Emotions (see Figure 2).

The aims of this study were to ascertain the emotional responses experienced by professional rugby union players experiencing ACL injury; to assess changes in coping strategies used by these players pre- and post-surgery; and to consider how these coping responses affect the injured player's emotions. The result of the present study will be discussed in five sections: (1) Pre-surgery Emotions; (2) Post-surgery Emotions; (3) Pre-surgery Coping; (4) Post-surgery coping; (5) Influence of Coping on Emotions.

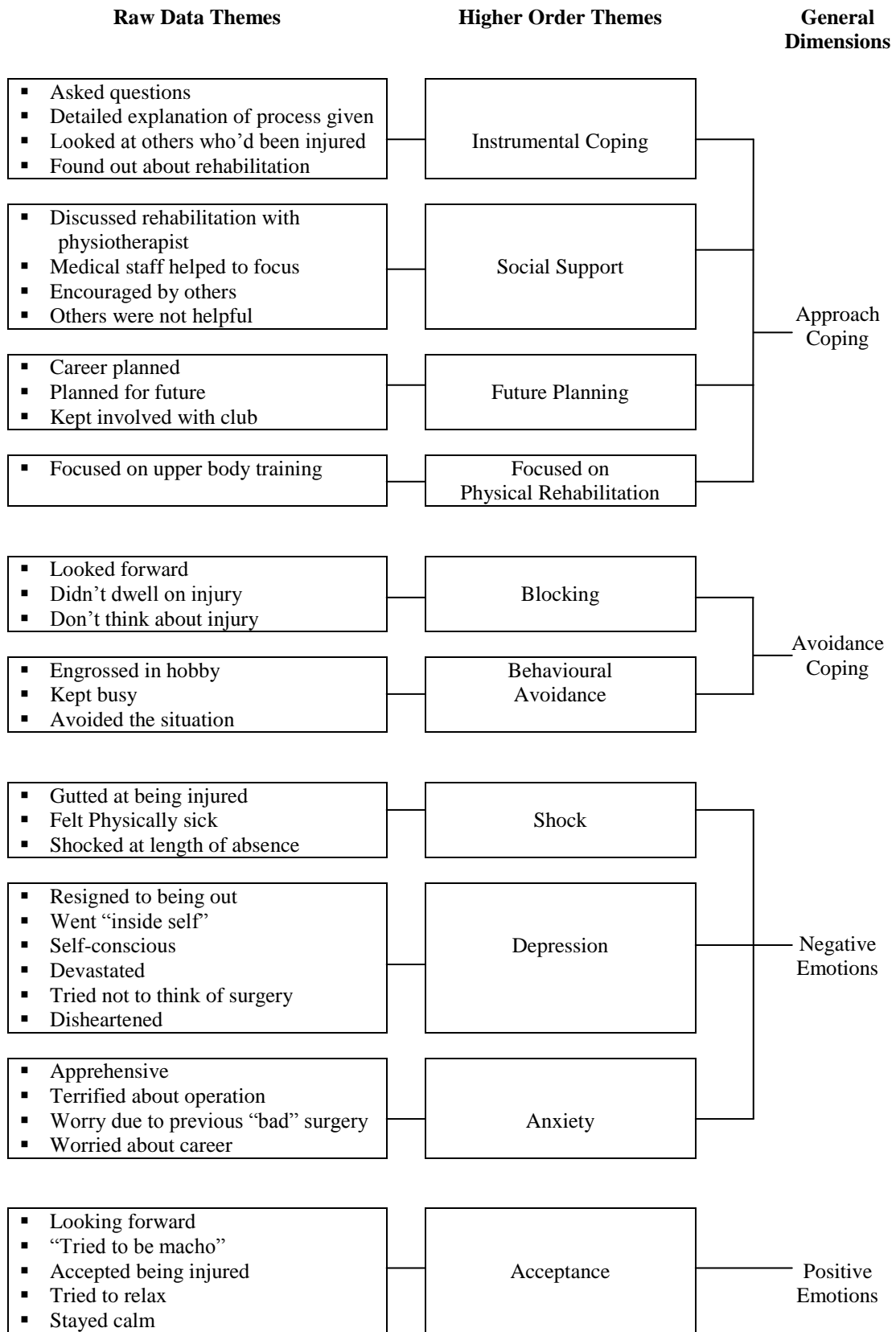


Figure 1 – Pre-Surgery

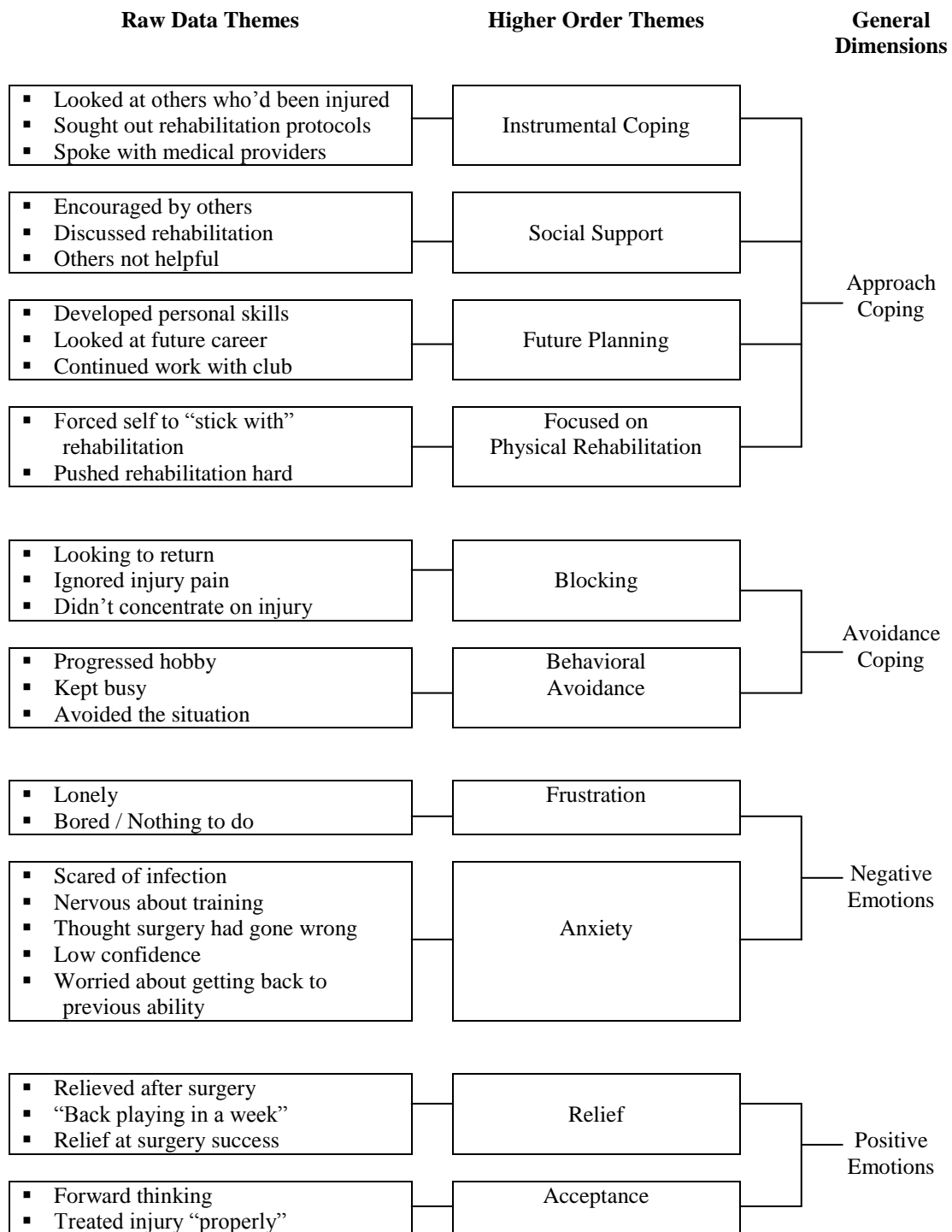


Figure 2 – Post-Surgery

### *Pre-surgery Emotions*

The results of the present study support previous findings that after sustaining a serious injury athletes experience the most intense emotional response (Crossman, Gluck & Jamieson, 1995; Quackenbush & Crossman, 1994). The types of emotions also conform to previous findings and included shock, depression and anxiety immediately

following injury (Johnston & Carroll, 1998; Leddy et al., 1994; Smith et al., 1990). Player 4 stated, “I was gobsmacked, completely shocked”. While player 3 commented, “I knew this was a serious injury. The noise was worst. I felt physically sick”, and player 5 noted, “I was gutted at being injured and the length of time out”. Tracey (2003) highlighted that negative thoughts are experienced immediately following the diagnosis of injury severity, however these emotions decrease over time (Johnston & Carroll, 1998). Following initial shock, depression appears to be the most prominent emotion, due primarily to incapacitation and disruption of normal function (Johnston & Carroll, 1998). Player 1 commented in the ERAIQ that, “I think of myself as very independent and hate feeling really useless for having to rely on others”. The player’s forced withdrawal from competitive rugby is a major cause of increased depression (Tracey, 2003). Player 1 continued, “Rugby is a massive part of my life and my time is completely based around playing and training. If I can’t train or play I’m not happy and I hate being restricted”. This suggests that the player’s athletic identity was affected during this time. All players scored themselves as a ‘5’ on the ERAIQ, indicating they regard themselves as an athlete. By no longer being actively involved in the sport, this reduced athletic identity could impact adherence to the rehabilitation process (Taylor & Taylor, 1997). Player 5 stated, “I went inside myself, became very self-conscious, just trying to avoid everything. This could be hindering my rehabilitation”, while player 2 went on a massive “blow out” using alcohol for avoidance.

As could be expected fear and anxiety are heightened immediately prior to surgery (Morrey et al., 1999), however the intensity of these emotions experienced appeared to be moderated by prior injury experiences. Player 5 commented, “I’m terrified about the surgery. I worry about the operation due to problems with my previous operation”, while Player 1, who had a more positive previous experience,



stated, “I wasn’t really nervous before the surgery, as I had been ‘scoped’ twice before and was familiar with the process”.

### *Post-surgery Emotions*

Ray and Fitzgibbon (1981) believed that increased anxiety prior to surgery has debilitating effects on the post-surgery rehabilitation. Although further research is required, Players 1 and 5 contradict this notion. Player 1’s diary recording stated, “Relief operation was a big success but still anxious about it”, while player 5 observed, “The operation went really well. I feel like I’ll be back playing in a week”. Post surgery emotions were mostly positive with relief the overwhelming emotion (“It was a relief after the operation. Now I can concentrate on playing again”; “It was good to now be able to concentrate on getting better, knowing this was the beginning of the end”). The results provide some support for Tracey’s (2003) findings of concerns related to loss of fitness, loss of independence and asking for assistance. Further anxiety was emphasized by players 3 and 4 post-surgery, with a fear that “something had gone wrong”. Both players may have a predispositional trait for increased anxiety, although this was not measured in the present study, but both regularly discussed the worst case scenario. Future research could utilise specific identification methods for predispositional coping, such as the trait version of the COPE questionnaire (Carver et al., 1989), to assess this.

Similar to pre-surgery emotions, incapacitation led to increases in frustrations (“I’m limited in what I can do. I want to get back quicker and do more, but I know that I can’t”; “I’m so bored. I don’t know what to do with myself”). Each player’s acceptance of being injured appears to counteract this frustration and reduce the chances of non-adherence to the rehabilitation protocol (“I make sure I treat the knee properly. Plenty of ice and rest, and making sure I do all the exercises”). Further research is required to ascertain the impact of acceptance to reduce frustration, however acceptance of the injury severity does increase adherence to the rehabilitation (Bianco et al., 1999). Again

prior injury experience also appears to influence each player's adherence, with those who have not suffered a previous injury more hesitant in accepting the seriousness of the injury (Johnston & Carroll, 1998; Niven, 2007).

### *Pre-surgery Coping*

Instrumental coping strategies are of prime importance to player control of emotions following injury and pre-surgery (Udry, 1997). Similar to findings by Tracey (2003) the players in this study were active in gathering information related to the surgery and the rehabilitation protocol. All players stated they had spoken in detail with medical providers or searched the internet for information ("I read up on the operation and also found things on the internet concerning recovery and rehabilitation methods"; "It's miles better knowing the process. It really helps me to be more patient"; I'm trying not to think about [the surgery], but have found out a lot about the [rehabilitation] process"). Previous research demonstrates the benefit of this to injury rehabilitation (Bianco et al., 1999; Brewer et al., 1995). Further, information gathering about surgery increases knowledge and therefore increases cognitive coping, which may be the most effective way to prepare for an operation (Ridgeway & Mathews, 1982). More effective coping strategies are employed when an athlete has a better understanding of the injury (Ninedek & Kolt, 2000). Instrumental coping is assisted by the social support available to each player. Social support is influential in dealing with the emotions of injury and surgery (Gould et al., 1997b; Udry, 1997), and the medical staff involved appears the most important source of social support (Tracey, 2003). Player 4 expanded, "The medical staff has got me focused. Given me lots of information on the operation and [rehabilitation] program". Teammates are also a useful source of support (Johnston & Carroll, 1998). All players talked to others who had suffered the same injury or been absent from the sport due to serious injury, and took heart from their experiences ("I talked to other players who had been through the same injury to hear their thoughts";

“Having people to support me was great. It allowed me to get the support from all areas and not just be limited to one person’s advice, especially guys who had been through it”). The type of support provided to the injured player impacts upon their emotions (Niven, 2007). Unhelpful support could be provided by individuals trying to minimize the importance of an event, avoid open communication about the event, criticize attempts at coping, encourage quicker coping, and give inappropriate advice (Lehman et al., 1986). Player 5 believed, “Some of the others were not helpful, telling me I’d be back in no time”.

Each player’s initial appraisal of the injury influenced the coping response employed. Player 2 appraised the injury as a relief (“Nice to have a break from the stress of competition”), allowing him to become removed from the daily pressure of professional sport, resulting in an increased use of avoidance coping strategies immediately following diagnosis of the injury severity (“I went for a massive blow out for a few days after being told about the injury. I really didn’t give a shit. I’d go out drinking till early in the morning .... I didn’t have to worry about training or who I was playing next week. All I had to worry about was how I was getting home and making sure that I didn’t fall over”). Such avoidance can have detrimental effects of the player’s rehabilitation (Kim & Duda, 2003). Conversely players 1 and 3 in particular appraised the injury as an opportunity and utilized the time for personal and career development (“I took it as an opportunity to develop myself”; “I thought about my career and what I would do after I finished playing. Having the time now allows me to prepare for that day”).

#### *Post-surgery Coping*

The provision of social support available to the injured players was primarily facilitative in nature following surgery. Medical staff are in a position to provide the majority of this support (Robbins & Rosenfeld, 2001), with each player highlighting the

benefits of developing a good relationship with the physiotherapist (“I met with [physiotherapist] really early and we discussed the plan for the next while and what we both expected to be doing. It was good to get that reassurance and to put a plan in place”). Teammates also prove to be an important source of support, corroborating previous research that found teammates provided both emotional and reality confirmation support (Corbillion et al., 2008), are utilized as models (Gould et al., 1997b), and offered tangible support (Bianco, 2001). Post-surgery comments made by the players relating to teammate support were similar to those made prior to surgical intervention (“I’m trying to keep involved with the team, learning all the latest strategies and game stuff, but mostly because they encourage me and motivate me to continue”). However, problems can be experienced when the support provided does not equal the needs of the player (Udry, 1997). Particularly detrimental could be the surgeon’s approach to the injured player (Johnston & Carroll, 1998), and his / her comments could increase negative emotions (Quackenbush & Crossman, 1994). Such an instance occurred with player 3 (“I got an infection [after surgery]. The doctor wasn’t great, he kept telling me the worst case scenario, saying I could even lose my leg”). Similarly, although social support provided by teammates was beneficial, Tracey (2003) noted that attending team practice sessions and games were difficult for injured players. The present study supports this, with an increased intensity occurring when the player’s team is performing poorly.

#### *Effect of Coping on Emotions*

Goal disengagement and reengagement are influential in managing emotions when the original goal becomes unobtainable (Wrosch, Scheier, Miller, Schulz & Carver, 2003b), particularly for professional rugby union players when the performance goals are disrupted by long-term injury. These players concentrated on physical rehabilitation, utilizing a wide range of approach orientated coping strategies, in order to

control the negative emotions experienced when injured. Similarly avoidance strategies appear to facilitate emotional control, with some players stating their need to remove themselves from stressful situations. CHIP and SIP data further corroborate this, with all players stating very much in answer to the statements related to making future plans.

Increased amounts of social support facilitate coping with the demands of rehabilitation (Green & Weinberg, 2001) and is often least available immediately following injury and after surgery (Heil, 1993). All players received social support from a wide range of sources at this time. Medical providers could have the greatest authority at this stage and the support offered influencing either positive or negative emotional responses. Family, friends and teammates appear to assist in controlling some emotional aspects (“My parents were great. They stopped me dwelling on the injury and feeling sorry for myself”; “Having all those people to support me was great. It allowed me to get the support from all areas”). Injured players just need to be aware of unhelpful support provided by unskilled others who may try to minimize the importance of the rehabilitation, avoid open communication about the injury, criticize attempts at coping, encourage quicker coping, and give inappropriate advice (Lehman et al., 1986).

The information provided by these injured professional rugby union players highlight the idiosyncratic nature of injury rehabilitation (Gallagher & Gardner, 2007). The use of a small homogenous group of professional athletes is a limitation of this study and these concepts need to be investigated further in the wider athletic population. The health care available may be considerably different within sporting populations, which could affect the emotional responses and coping behaviors. Further differences may be noted between co-acting and interacting sports, specifically as teammate support appears to facilitate the injured player.

## Conclusion

Pre-surgery emotional responses corroborate previous literature (Johnston & Carroll, 1998; Tracey, 2003) with shock, depression and anxiety predominant. Following successful surgical intervention these emotions are replaced by positive emotions, principally relief. Similar coping strategies were utilized pre and post surgery, with instrumental coping strategies and social support used consistently to manage the emotional characteristics of surgical intervention, and both appear essential for the injured player. Information gathering about the surgical procedure and rehabilitation protocol aided preparation for surgery and facilitated post surgery coping, while utilizing teammates as role models may benefit rehabilitation. Further some avoidance coping may be facilitative to the rehabilitation process and can be used to control negative emotions. Previous injury experience can be prominent in controlling emotions and utilizing facilitative coping strategies, with those who have suffered prior serious injury more likely to engage in such activities.

## CHAPTER 5 – STUDY 2

## Experiences of Professional Rugby Union Players Returning to Competition Following Anterior Cruciate Ligament Reconstruction

Return to competition following anterior cruciate ligament (ACL) injury utilizing conservative, traditional programs takes on average nine to twelve months rehabilitation (Shelbourne & Wilckens, 1990). More recently accelerated programs have been employed with the aim to return the athlete to prior performance levels within six months (Shaw, 2002). From a medical or physical perspective accelerated programs are believed to be more effective for younger adults, but have been associated with an increase in the possibility of further injury in the future (Mendonza et al., 2007). There are no set criteria established for return, however all stages of the ACL rehabilitation protocol should be successfully completed before return to competition (Kvist, 2004). Of primary concern is re-injury of the ACL or to other structures (i.e. menisci, cartilage, other ligaments), with re-injury rates ranging between 2.3% and 13% (Myklebust & Bahr, 2005). Kvist (2004) recommends that a completed rehabilitation with adequate muscle strength and joint movement, with functional knee stability be achieved before return to competition. Despite the extensive discussions related to the medical or physical aspects of return to competition following ACL reconstruction, only minimal investigation has been paid to the psychological components. Not surprisingly, Kvist et al. (2005) recently called for an increased focus on the psychological factors to assist athletes returning to competition following ACL injury.

Taylor and Taylor (1997) proposed the ‘Stages of Return to Sport’ model to contemplate the process between rehabilitation and return to full participation in sport. The model assesses the gaining of physical competence in the injured limb to becoming physically prepared for return to the rigors of competition. They suggested both positive and negative emotions can be experienced by the injured athlete at this stage, and

suggest the sports medicine team hold in-depth discussions with the athlete to reduce concerns related to return to competition. However, a number of limitations have been identified with this model and as such it has received only limited empirical support (Podlog & Eklund, 2007a). Brewer (2001) found no support for sequential progression of injured athletes through the stages, while Eklund and Bianco (2004) argued about the lack of individuality regarding the speed of progression. Further, it is also difficult to identify when the initial return phase actually commences (Podlog & Eklund, 2007a).

Consequently a biopsychosocial model was offered by Brewer et al. (2002). This model argues that seven components (characteristics of the injury; sociodemographic factors; biological factors; psychological factors; social / contextual factors; intermediate biopsychological outcomes; and sport injury rehabilitation outcomes) combine to determine the outcomes of the rehabilitation. Again, although the model provides an overview of the numerous factors involved Podlog and Eklund (2007a) debate that it does not provide a comprehensive explanation of differing outcomes. What is not debated is that a range of physiological, psychological and social aspects are involved with successful return to competition (Andersen, 2001).

Webster et al. (2008) identified fear of re-injury as the primary reason for athletes' failure to return to sport after ACL injury, while Kvist et al. (2005) reported 24% of participants cited fear of re-injury as the justification for not returning. Within earlier stages of the rehabilitation process fear of re-injury has been recognized to not just being limited to concerns related to the injured body part, but also with lack of physical fitness and a perceived inability to achieve previous performance standards (Tracey, 2003). Failure to regain position within a team could exasperate these negative emotions and increase self doubt (Podlog & Eklund, 2006). Fear of re-injury may escalate if the athlete does not fully complete the rehabilitation program (Taylor &



Taylor, 1997); is pressured into returning (Bianco, 2001); or if confidence is not expressed by significant others (Heil, 1993).

Having confidence in the injured knee is crucial for successful return following ACL reconstruction (Heijne, Axelsson, Werner & Biquet, 2008). Physical competence can be increased by ensuring the athlete successfully completes clinical and sport specific tests (Cox, 2002). The use of an effective goal setting program within this phase has been shown to benefit return (Evans & Hardy, 2002), with the achievement of goals enhancing self confidence (Podlog & Eklund, 2006). Following actual return to competition confidence is gained by success in performance (Johnston & Carroll, 1998), with the athlete benefitting from becoming more competent in their ability. Maygar and Duda (2000) noted that those working with returning athletes certify they overcome issues of low self efficacy prior to return. As such the treatment team could allow the athlete greater autonomy and control over their return (Podlog & Eklund, 2007a; Podlog et al., 2010).

Few studies have investigated the psychological factors experienced by professional athletes returning to competition following ACL reconstruction. The available research has made reference primarily to enhancing self-confidence, with some suggestions that goal setting, relaxation and imagery could be beneficial coping strategies. Further, the majority of those studies have not been conducted concurrently with the athletes return, and as such may be limited by the retrospective nature of their design (Brewer et al., 1993). Therefore the present study investigated the experience of five professional male rugby union players during their return to competition, in order to ascertain the emotional reactions and coping strategies actually utilized during their return.

## Method

*Participants*

Following institutional ethical approval and completion of informed consent, five professional rugby players who had suffered an ACL injury that required surgical intervention committed to the study. Full participant details are available in Table 1.

Table 1 – Participant Demographics

<b>Player</b>	<b>Age</b>	<b>Position</b>	<b>Length of Time Prior to Surgery</b>	<b>Length of Rehabilitation</b>	<b>Suffered Previous Severe Injury</b>
1	23	Backrow Forward	4 weeks	11 months	Yes
2	27	Backrow Forward	3 weeks	6 months	Yes
3	27	Fly Half	2 weeks	8 months	No
4	18	Full Back / Wing	2 weeks	12 months	No
5	24	Centre	4 weeks	12 months	Yes

*Procedure*

This was a longitudinal study conducted concurrent with each player's rehabilitation and return to competition, comprising of five in-depth interviews (2 while in the final stages of rehabilitation; 1 pre first game back; 1 post first game back; and 1 following 3 games back in competition) and a pre-designed self-report diary. The semi-structured interview guides focused on each player's cognitions, emotions and coping strategies experienced and were based on previous literature (e.g., Podlog & Eklund, 2006). The use of semi-structured interview guides allowed each player to answer the same questions, while permitting each interview to pursue idiosyncrasies within each player's experience. The ordering of questions was flexible to allow the conversation to flow freely, and where appropriate probe questions (e.g., explain how this helps?) were utilized to gather further information. Each interview lasted on average 30-45 minutes and was conducted in private either at the player's club or over the telephone.

Each player completed a pre-designed, self-report diary to allow them to record day-to-day changes related to their emotions and coping strategies. Specifically each player was instructed to record both positive and negative emotional changes, and indicate the strategies utilized to cope during the rehabilitation related to both the injury and life in general. Each player was instructed to record changes when they were experienced, and to answer the specific questions that related to the pre first game, post first game and after the third game back in competition stages as close as possible to the occurrence. The diaries contained pre-designed questions related to coping and emotional reactions, and were linked to the information obtained from the interview scripts.

#### *Data Analysis*

Each interview was audio taped and transcribed verbatim, with a hierarchal content analysis conducted on the interview transcripts and diary entries for the pre- and post-return to competition data separately. Utilizing guidelines by Tesch (1990) a detailed examination of the data to identify topics that best describe particular segments of text was conducted, followed by a determination of common features that characterize the text segments in order to create and understand the relationship between topics. Specifically the following five-step process was applied: (1) All interviews and diary entries were read and reread to allow the analyzer to obtain familiarity with them; (2) Significant statements and phrases that directly related to emotions and coping were extracted; (3) These significant statements were arranged with similar terms to form raw data themes for each phase; (4) These raw data themes were then integrated into higher order themes by which the experience was described; (5) Ultimately, all higher order themes from each player were compared, in order to examine the common themes endured. These common themes are of the greatest generality, meaning that no links could be uncovered among these themes.

Trustworthiness (Lincoln & Guba, 1985) of the data was developed by concurrent analysis of different data sources, prolonged engagement, member checking, peer debriefing and negative case analysis.

### Results and Discussion

Content analysis was split into the general dimensions of Influential Emotions or Coping Strategies. Pre-return analysis revealed 28 raw data themes, which composed six higher order themes. Confidence Building, Anticipation and Anxiety formed the general dimension Influential Emotions, while the Coping Strategies general dimension comprised of the themes Physical Preparation, Psychological Preparation and Social Support (see Figure 3).

Twenty-six raw data themes were established from the post-return to competition data, with six higher order themes identified. Confidence Building, Positive Performance Emotions, and Performance Anxieties formed the general dimension Influential Emotions; and Problem Focused Coping, Social Support, and Dealing with Fears assembled the Coping Strategies general dimension (see Figure 4).

The aim of the present study was to identify the emotions experienced and coping strategies utilized by profession rugby union players returning to competition following ACL reconstruction. The results will be discussed in relation to pre-return and post-return experiences.

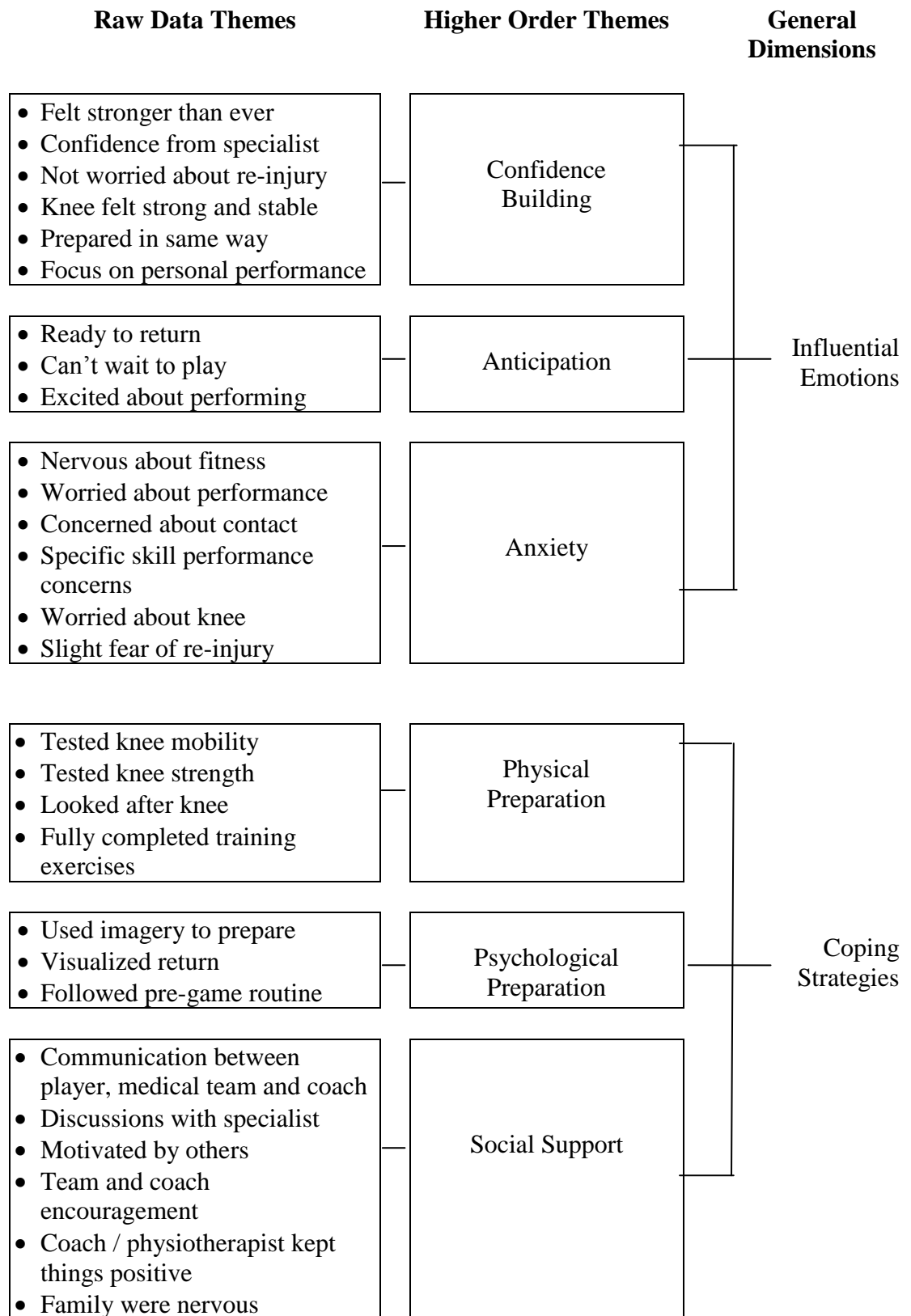


Figure 3 – Pre-Return Results

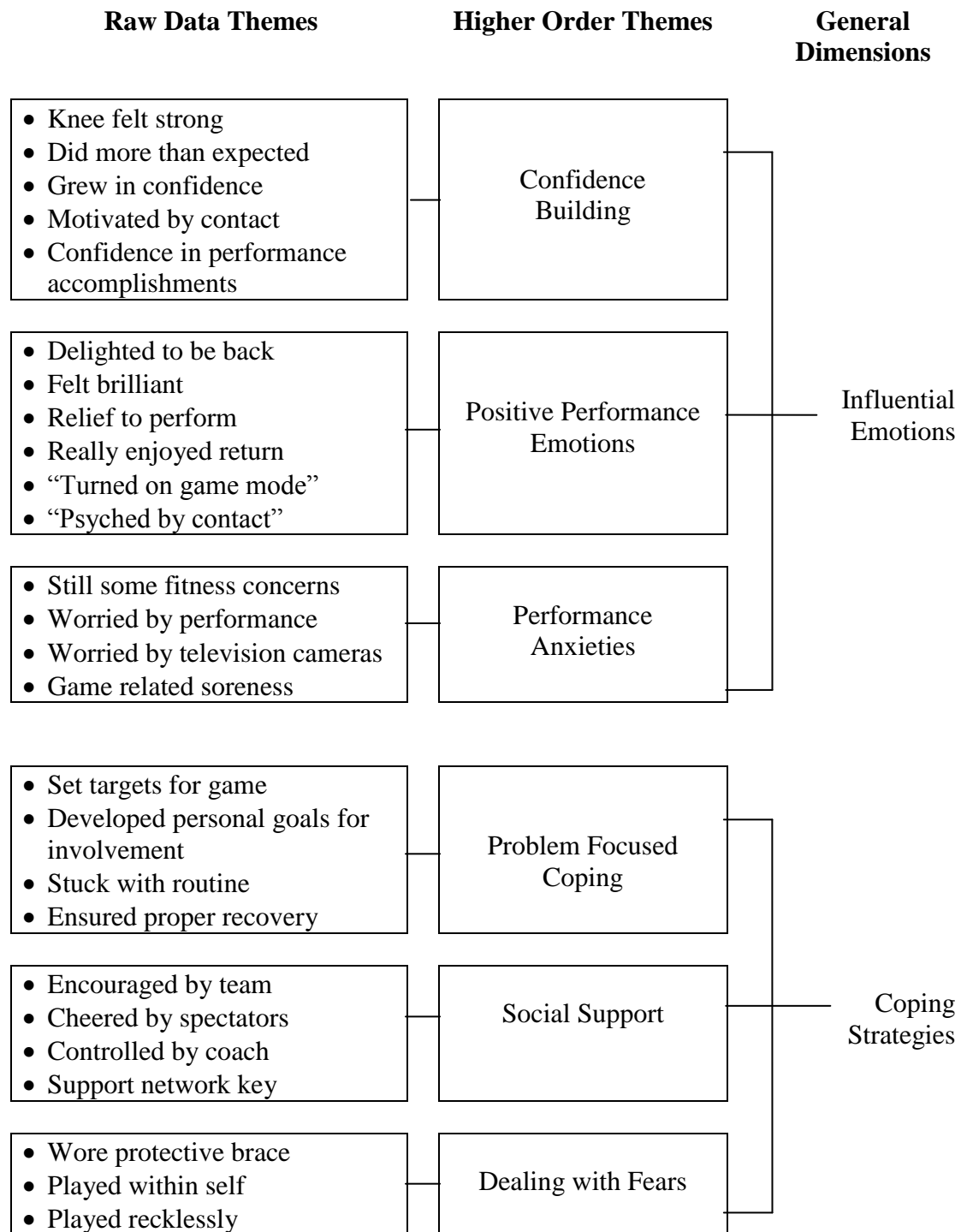


Figure 4 – Post-Return Results

#### *Pre-Return to Competition*

The main aim for all players prior to competition was to build confidence in the injured knee joint. The successful completion of strength and sport specific tests (Cox, 2002), and consistency in training (Podlog & Eklund, 2006) aided this development (“I

used to worry a bit about injuring [the knee] again, but these thoughts have gone. I know that all the exercises I have gone through have put me in a good position”). As players progressed through the final stages of preparation for return, each became more positive about returning to competition (Langford et al., 2009). Player 1 stated, “I feel extremely ready to return. My knee feels strong and stable; and has done all through training”, while player 2 commented, “I can see all the progressions I’ve made and know how far I’ve come. I feel stronger and stronger, and can’t wait to get back out there and show everyone what I can do”.

A range of coping strategies were implemented to facilitate the development of confidence. Players, with the assistance of the treatment team, ensured they fully completed all training exercises and reached above minimum targets during physical and medical tests. Although pressure can be placed on athletes to return quicker than physically ready (Bianco, 2001), it may be more important within professional sports settings to ensure each player is fully rehabilitated, as the consequences of re-injury and losing a player for the duration of the competition could be dramatic. Communication between all involved with the return to competition decision is important for successful return. The player, coach and treatment team should discuss both physical and psychological readiness for return (Magyar & Duda, 2000). Three of the five players reported open discussions to decide when the player would return to competition and what the expectations for their return would be (“The coach, [physiotherapist] and I all sat down to look at the schedule and decide when it was best for me to return to the line up. They wanted to ease me back in gently and we looked at how long I would play for”). Players 4 and 5, who did not have these conversations, spoke of feelings of isolation however they also stated they accepted the physiotherapist’s decisions. These two players were not key performers in their team, in the same way that the other three

players were considered 'star players'. Further research is required to ascertain differences in return of regular starters compared with squad players.

Although all players had a high level of anticipation for return to competition, all still commented on anxieties prior to return. Corroborating previous research only minimal fear related to re-injury (Tracey, 2003), while the majority of concerns related to performance and fitness levels ("I'm more nervous about how I will perform rather than how my knee will be"; "I know my fitness is not where it needs to be yet. It's game time that I need and the only way I'll get that is by playing"). Specifically players noted that contact situations held some fears at this stage ("You can do all the training but it is not until you get out there and do it that you really know. I'm slightly nervous about getting tackled again but I'm sure that will pass when I am on the field and engrossed in the game"). Further, specific skill execution fears were experienced by player 3, whose position entailed that he performed the majority of kicking duties. He expressed, "I was also a bit worried about the power I could get kicking the ball. I knew I'd done all the testing but it was still quite nervy".

Utilizing psychological skills can also aid return to competition (Handegard, Joyner, Burke & Reimann, 2006). All players stated they stuck to their normal pre-performance routine ("I just followed the same routine. Got myself organized in the same way"; "Following the same routine helps. It has always gotten me focused and it should be any different now. I'm taking it the same as any other game"). The use of performance routines in sports settings has been acknowledged to facilitate performance (Jackson & Baker, 2001), and these should be encouraged when returning to competition following serious injury. Players also noted using imagery to assist preparation to return ("I visualized where I need to be and what I would do in certain situations"). None of the players, however, was provided with dedicated sport



psychological support. This despite the notion that in particular the use of imagery might benefit rehabilitation (Driediger, Hall, & Callow, 2006).

Players 2 and 3 were sent by their clubs to a medical specialist in ACL rehabilitation and both discussed the benefits of this to their rehabilitation (“Knowing a real specialist was helping me, really motivated me... The atmosphere was different... [I was] focused to get stuck into it”; “The guys the best apparently... So I’m quite excited about it. It’s always good to work with the best. I’m lucky to be in this position so I’m going to grab it with both hands”). Both players grew in confidence from their time with the specialist and were able to discuss in detail how other professional athletes coped with the return to competition. It is suggested that professional players will gain vastly in self-confidence when encouraged by recognised experts.

#### *Post-return to Competition*

Following successful return to competition, each player was overwhelmed by positive emotions (“I felt great. It was so good to get back out there and perform. I was delighted to be on the pitch again... it was just an amazing feeling... I just can’t wait till the next one”). Performance accomplishments also increased positive reactions, with each player becoming engrossed in competition. Confidence in the injured knee increased with game time and performing certain activities (“I put a massive hit in. I just caught this guy, ball and all. It psyched me up a lot”; “The more I played the less I focused on the knee. I think you tend to forget most things when you compete”).

Players were still cautious about their return (Shelley, 1999), with all still concerned about general fitness levels and suffering increased game related soreness after competition. A number of strategies were implemented to cope with this. Player 2 noted that he initially “played within myself” and not to his full potential, while player 5 commented that he “played recklessly, trying to prove myself”. Similarly player 4 confronted his fears by wearing a protective sleeve (“I’ve worn a sleeve over my knee

since I've been back. I don't think it does much physiologically but it just reassures me. Keeps me from thinking I might injure my knee again"). Problem focused coping strategies may be better utilized to facilitate return to play (Kori et al., 1990). Specifically, effective goal setting programs have been shown to assist return to competition (Evans & Hardy, 2002). Each player's coach approached goal setting from a different perspective. All players were given a specific amount of time that they would be competing for, which reduced anxieties related to fitness levels ("I knew I would have a set time to play, so it meant I didn't have to worry about lasting. I could just go full on till the end; and that was positive for me because it gave me a good indication of how my knee would be and where I stood fitness wise"). Some coaches set more performance specific goals, which included being involved in play a certain number of times. Player 4 stated, "[Coach] said I needed to come in field and get involved on five separate occasions. It was good to have this target, as I could have easily stayed out on the wing and not been involved". Podlog and Eklund (2006) suggested realistic goals will assist development of self-confidence for players returning to competition and reduce performance inability frustrations, while also encouraging the player to accept they may still have limitations. Further research is required to understand both the positive and negative impact of specific goals for returning players.

Social support provided to each player was influential to his successful return. As a professional there is a unique opportunity to gain encouragement and support from spectators ("It was awesome having the first game at home. The crowd noise was brilliant and I got such a cheer when my name was called, it really pumped me up, really focused me"; "The crowd gave me an excellent reception, which reduced some of the nerves"). Teammates and coaches also provide beneficial support prior to and during competition (Corbillion et al., 2008), and should be encouraged to keep a highly positive pre-game environment (Podlog, 2006). The treatment team can also provide

important support aimed at reducing concerns related to the injury. Player 3 commented, “[Physiotherapist] was really reassuring. He actually noticed I was a bit nervous and pulled me aside to say how well I’d rehabbed and that the testing we’d gone through was more intense than what I would experience”. Following return each player’s physiotherapist ensured that they properly recuperated and cared for the injured knee.

The use of a specific homogenous group can be considered a strength of this research, with the results applicable to professional sports settings. Many professional athletes are highly dedicated to training and competition, and as such their experience may be significantly different to that of recreational performers (Andersen, 2001). The generalization of the findings may however be limited due to the small sample size. Further research is required with a larger number of professional athletes, across a range of sports, to confirm the higher order themes identified. Additionally the effectiveness of the coping strategies has not had specific investigation within the present study. Before such strategies can be recommended research needs to be conducted to uncover the success of these, particularly in relation to dealing with fears of re-injury.

### Conclusion

Gaining confidence in the injured knee appears to be crucial for professional rugby union players returning to competition following ACL reconstruction. Ensuring each player fully completed the rehabilitation program and the use of both clinical and sport specific tests, demonstrates the strength and ability of the injured knee to the player; however a number of concerns can still persist. Significant gains in confidence are obtained by performance accomplishments, and coaches may assist by providing a specific, realistic goal setting program. Further the use of psychological skills (i.e., imagery; performance routines) may reduce anxiety and increase preparation for performance. A range of positive emotions are experienced by players returning to

competition, with excitement about performing noticeable prior to actual return, and relief and delight prominent following successful performance. Within professional players there is only limited fear of re-injury, with greater fears relating to performance and fitness issues. Support networks should aim to reduce these concerns and promote confidence, while being aware of increased anxieties that may be associated with the injured knee.

## CHAPTER 6 – STUDY 3

## The Facilitative Nature of Avoidance Coping within Sports Injury Rehabilitation

A number of studies have investigated the use of coping within sports injury rehabilitation settings (e.g., Albinson & Petrie, 2003; Gould et al., 1997b; Smith et al., 1990). The majority of these studies have supported Lazarus and Folkman's (1984) view of the dynamic nature of coping. The cognitive-motivational-relational theory of stress and coping (Lazarus, 1999) views coping with stress as a dynamic and recursive process involving transactions between the environment and personal variables where an individual makes an appraisal of the situation.

Coping has been defined as “constantly changing cognitive and behavioural efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (Lazarus & Folkman, 1984, p.141). At the microanalysis level, where coping approaches focus on a large number of specific coping strategies, coping has been separated into two higher order dimensions. Approach oriented coping refers to concentrated efforts to manage a stressful situation (e.g., goal-setting, planning, positive reinterpretation) whereas avoidance oriented coping is concerned with activities or cognitive changes to avoid the situation via distraction (e.g., blocking, cognitive distancing) or social diversion (e.g., walking away, remove oneself from the situation) (Endler & Parker, 2000). Avoidance coping, in this respect, is not simply a lack of approach oriented coping but also includes active removal from the stressful situation. In addition, approach oriented coping is associated with the expression of emotions elicited by the stressor and active search for social support. Avoidance coping on the other hand would result in venting of emotions and social withdrawal (Roth & Cohen, 1986).

Avoidance coping has been a regularly used coping strategy by athletes to deal with acute stress during sport participation (e.g., Nicholls et al., 2006) as well as to deal

with stress during the early stages of retirement from sport (Sinclair & Orlick, 1993). For example, basketball players have been found to use avoidance coping strategies to accept bad decisions by officials (Anshel & Kaissidis, 1997) and blocking was the second most used coping strategy by professional rugby union players when dealing with acute stress during competitions or training (Nicholls et al., 2006). Although avoidance coping can be adaptive in the short term, it has been suggested that this is maladaptive in the long term (Carver, Scheier, & Weintraub, 1989; Kim & Duda, 2003; Mullen & Suls, 1982). For example, avoidance coping has been associated with a number of negative psychological and physiological outcomes. Avoidance coping is associated with reduced resistance to disease and immunocompetence (e.g. Suls & Fletcher, 1985), prolonged cardiovascular reactivity (Vitalino et al., 1993), increased distress (Blalock & Joiner, 2000), and negative affectivity (Ingledrew et al., 1997). With regard to the latter, avoidance coping results in increased emotional and physical distress even when controlling for initial levels of stress (Holahan & Moos, 1986). It has also been suggested that avoidance coping strategies may inhibit injury rehabilitation (Brown, 2005). Albinson and Petrie (2003) found a reciprocal relationship between avoidance coping and less active coping strategies and suggested that increases in avoidance coping may reduce the chances of the athlete dealing with the injury effectively resulting in longer time spent in rehabilitation or possible failure to return to prior competitive levels.

Avoidance coping, however, may be important for those athletes who experience a serious injury that requires long-term rehabilitation. For example, distraction coping was frequently reported in skiers who experienced a season ending injury (Gould et al., 1997b). Distraction coping, in this respect, allows the athlete to engage in more pleasant activities, avoid feelings of helplessness and reduced self-esteem (Hatzigeorgiadis,

2006) and reduce levels of distress following injury (Beasley, Thompson, & Davidson, 2003).

Carver et al. (1989) have suggested that avoidance coping is most likely to be used in situations where the individual perceives to have limited control to alter the outcome of the situation. More specifically, when goals are out of reach for the individual irrespective of investment of effort, then avoidance coping strategies (disengagement) can be adaptive and commitment to alternative goals might increase (Wrosch et al., 2003a). This notion might be particularly relevant for athletes suffering from anterior cruciate ligament (ACL) injuries. Rehabilitation from ACL injury does not only take a relatively long period of time but also involves fairly regimented rehabilitation protocols (Shelbourne & Nitz, 1990). In particular, injured athletes are required to adhere to daily exercise regimes allowing little room for additional activities. In such a situation increasing effort to achieve the goal of full rehabilitation and return to competitive sport can actually hinder the rehabilitation process. The removal from an uncontrollable situation by means of disengagement coping and the pursuit of additional goals could be an adaptive coping strategy which reduces stress and negative emotions when recovering from ACL injury.

To date little specific research has been conducted to investigate avoidance coping during sport injury rehabilitation. In addition, the results of the possible benefits and downfalls of avoidance coping for sport injury rehabilitation are equivocal. Therefore, the aim of this study was to investigate longitudinally the possible benefits of avoidance coping during rehabilitation from an ACL injury.

## Method

### *Participants*

Four male professional rugby union players aged between 18 and 27 years, who had suffered anterior cruciate ligament (ACL) injuries that required surgical repair and

six to twelve months in rehabilitation, were interviewed following initial injury and concurrent with their rehabilitation. Player 1 and 2 were back-row forwards (flanker), player 3 a fly-half and player 4 an outside back (fullback). Each player was competing in the highest league within their country. Player 1 and 2 had prior experience of serious injury and lengthy rehabilitation, while player 3 and 4 had suffered their first major injury within their career.

### *Procedure*

This study utilized a mixed methodological approach comprising of semi-structured interviews, diary recordings and established questionnaires relating to specific stages of injury rehabilitation. The semi-structured interview guide, as suggested by Patton (1990) and utilized by Podlog and Eklund (2006) focused on the player's cognitions, emotions and coping strategies experienced during the rehabilitation and was based on previous literature (e.g., Albinson & Petrie, 2003; Gould et al., 1997b). Following institutional ethical approval and obtaining informed consent, twice monthly interviews, utilizing the semi-structured guide and lasting on average 30-45 minutes in duration, were conducted with each player concurrent with his rehabilitation. In addition each player was asked to complete a pre-designed, self-report diary to allow them to record day-to-day changes related to their emotions and coping strategies. Specifically each player was instructed to record both positive and negative emotional changes, and indicate the strategies utilized to cope during the rehabilitation related to both the injury and life in general. Diaries allow for a more extensive investigation (Nicholls et al., 2006) as they can reduce the time between the event and recall. The Coping with Health, Injuries, and Problems (CHIP) inventory (Endler & Parker, 2000) was also completed towards the end of the player's rehabilitation. The CHIP provides a score for four subscales related to coping (Distraction coping; Palliative coping; Instrumental coping; Emotional Preoccupation) and has shown to have good psychometric properties



(Endler & Parker, 2000). The CHIP was utilized to assist with the triangulation of data related to the coping responses provided within the interviews and diary entries.

### *Data Analysis*

Each interview was audiotaped and transcribed verbatim and a deductive content analysis, as suggested by Patton (1990), was conducted on the interview transcripts and the diary entries. Specifically, the following five step analysis process was conducted:

(1) All interviews and diary entries were read and reread to allow the analyzer to obtain familiarity with them; (2) Significant statements and phrases that directly related to avoidance coping were extracted; (3) Raw data themes were established by grouping similar significant statements; (4) These raw data themes were then integrated into higher order themes by which the coping strategies used were described; (5) These higher order themes were categorized into either *Behavioural Avoidance Coping* or *Cognitive Avoidance Coping* general dimensions. For the purpose of this study behavioural avoidance coping was defined as ‘the conscious decision to remove oneself from a threatening environment’ (Krohne, 1993, p. 3) whereas cognitive avoidance coping was defined as ‘the responses aimed at denying or minimizing the seriousness of a crisis or its consequences. (Cronkite & Moos, 1995, p.578)

The CHIP scores were triangulated with the qualitative data to assist with the confirmation or rejection of the themes identified. The use of a combination of data analysis methods allows for a holistic view of each player’s perceptions to increase the reliability and validity of the data (Frechtling & Sharp, 1997). The advantage of using this form of mixed methodological approach is that it allows for the reduction of inaccurate interpretations of the qualitative data being attained. Trustworthiness (Lincoln & Guba, 1985) was established predominantly by this triangulation of data sources. Concurrent analysis of different data sources assists building a consistent rationalization for the identified themes (Creswell, 2003). Prolonged engagement,

member checking, peer debriefing and negative case analysis assisted in developing credibility. Furthermore, an audit trail, detailing all data and data analysis procedures, is available for additional inspection.

### Results and Discussion

Content analysis of the data sources identified 19 raw data themes that coalesced six higher order themes (Physical Distraction; Social Interaction; Maladaptive Behaviours; Denial; Thought Stopping; Cognitive Distraction), which were split into two distinct general dimensions labelled *Behavioural Avoidance Coping* and *Cognitive Avoidance Coping* (see Figure 5). Full CHIP profiles are represented in Table 2, with T-scores, indicating the percentile comparison to population norms, in parenthesis. Higher T-scores specify higher levels of coping behaviour (Endler & Parker, 2000).

Table 2 – CHIP profiles (T-score)

	Distraction Coping	Instrumental Coping	Palliative Coping	Emotional Preoccupation
Player 1	26 (62)	39 (79)	27 (57)	35 (78)
Player 2	25 (57)	29 (59)	17 (34)	23 (54)
Player 3	27 (62)	29 (52)	22 (46)	26 (61)
Player 4	30 (69)	35 (71)	22 (46)	29 (67)

The aim of the present study was to investigate the role of avoidance coping strategies during rehabilitation from an ACL injury. Content analysis identified both behavioural and cognitive avoidance coping strategies being employed to equal extent by the professional players in this study. Of principle importance was the use of distraction coping throughout the rehabilitation process. Distraction subscale scores on the CHIP ranged between 25 and 30, which can be classified as above average (only T-scores for the instrumental coping subscale were higher). These included specific behavioural coping strategies, such as taking up a new hobby or becoming involved with some alternate work (“I have been going to regular French lessons, which I enjoy

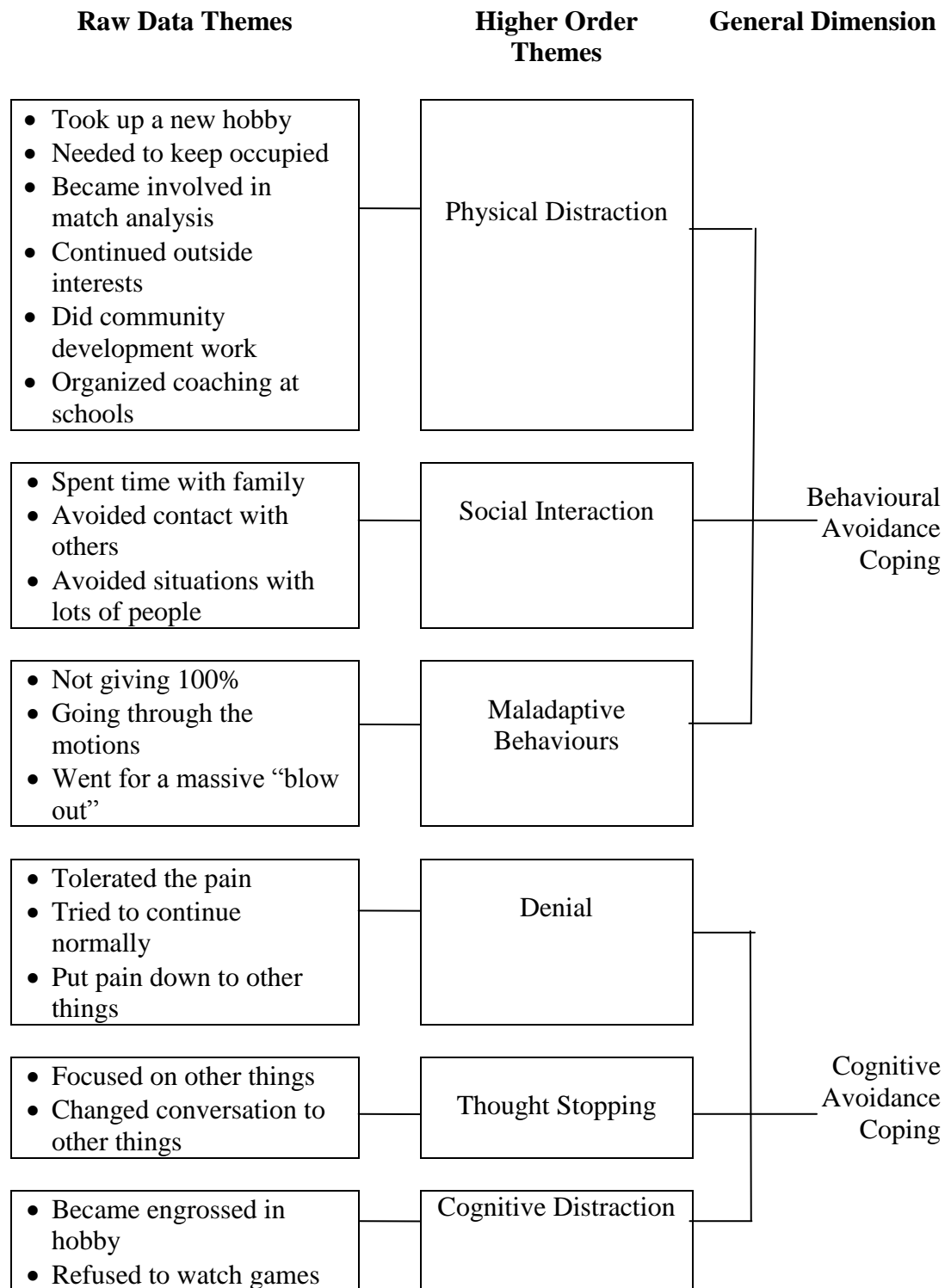


Figure 5 – Content Analysis Results

and keeps me busy”; “helping with the video analysis of opposition teams has helped me use up time during the day”); and cognitive strategies such as refusing to watch games (“I can’t watch any of it. Every time it’s on the television I have to turn it off”;

“I can’t be in the club when the squad is preparing to go to away games. I just can’t put myself through that”). Although no specific measurement of coping effectiveness was used within this study, analysis of the interview transcripts indicates self-reported perceptions of benefit of these methods by each player. Specific analysis of actual effectiveness of these coping methods is required, before a general conclusion can be confirmed. Players stated “getting stuck into other work helped” and “being engrossed in my new hobby allowed me to keep busy and stop dwelling on being injured”. Interview and diary transcripts suggest a number of self-reported benefits from utilizing physical distraction techniques. Player 1 provided a detailed analysis of the benefit he received from becoming involved with match analysis and using computer notation. These included personal performance development (“I could see different lines of running and better defensive positions”) and provided a sense of belonging (“It allowed me to feel part of the team, to be involved, even though I could not physically perform”). The advantage of self-determination within sports injury rehabilitation is becoming more researched over recent years (Podlog & Eklund, 2005), with initial suggestions highlighting the need for autonomy (Levy et al., 2008) and relatedness (Podlog & Eklund, 2006).

All players identified similar physical distractions and most of these pertained to personal or career developments (“I took it as an opportunity to develop myself”; “I thought about my career and what I would do after I finished playing. Having the time now allows me to prepare for that day”). Wrosch, Scheier, Carver, & Schulz (2003a, p. 1496) suggest these methods could “compensate for the distress associated with the continued pursuit of a goal that cannot be attained”. All players scored the CHIP statement ‘*make plans for the future*’ with the highest value available (5, very much). Comparable with Gould et al. (1997b), strategies included learning foreign languages, undertaking community development work, and developing media / business interests.

These strategies corroborate literature within the career transition domain (Anderson & Morris, 2000) thus suggesting that avoidance coping activities not only fulfil basic needs but also have potential long-term benefits to the player.

There was a common need for each player to remove himself from the situation on a number of occasions throughout the rehabilitation (“I had to stay at my parents after the surgery, just so I didn’t dwell on being injured all the time”; “I feel I should be back out there [with the team] rather than stuck in rehab. I’ve had to change my training times so I don’t see them training”). These social interactions, or lack of it, allowed each player to manage stressful, uncontrollable situations (Anshel et al., 2001). Statements made by players included: “Being able to fill the time away from rehabilitation and training was essential” and “At times I just want to be on my own, so people can not keep asking me how my knee is. I think I’ll get a sign to hang round my neck that says ‘my knees doing fine thanks, can we talk about something different’”. The CHIP statement ‘*be with other people*’ received an average score of 4.75, suggesting the nature of the social interaction determined the successfulness of this strategy. Care must be taken however, as there is a possibility that the performer may become too removed and hinder the rehabilitation process (Taylor & Taylor, 1997). One player stated “I’ve been spending time with some friends just to get away from everything, but because I’ve done that I’ve forgotten to do some of my rehab exercises”.

A range of different cognitive strategies were used to avoid the negative effects of injury. In particular, player 3 commented, “I can’t stand to watch games, even on the television. I have to turn them off or avoid them altogether, pretending they’re not happening”. The negative impact of non-involvement appears to have been significantly reduced by these coping strategies and it could be suggested that cognitive reframing becomes part of the rehabilitation process, especially when negative emotions are heightened. Other players noted feelings of depression and frustration in similar

situations (“I have the odd bad day when I will feel depressed; especially on match days when I have to watch from the sidelines and when the team are performing badly”). This may question Albinson and Petrie’s (2003) notion that the effectiveness of problem-focused coping strategies may be influenced by mood disturbance. However, individuality may be the influencing factor. The player’s understanding of self-concept and willingness to change could impact the benefit of this disengagement (Wrosch et al., 2003b). Furthermore, Gallagher and Gardner (2007) stressed the idiosyncratic characteristics associated with individual’s responses to injury.

Gould et al. (1997b) and subsequent research has highlighted the use of denial throughout the rehabilitation process. The interview data notes some form of denial to be common with these players (“Being told I was going to be out for about six months really shocked me. I thought there’s no way. No way I’m not playing for that long”; “There’s been a few times when I’ve gone to the weight room to do extra training. I’m not supposed to but I want to get back [to playing] quicker”). Lack of overall fitness was commonly blamed for pain and soreness experience in the injured knee joint. Similarly other players just ignored or tolerated the pain. Although this may have implications for the physiological rehabilitation, avoidance of this nature may assist with a speedier return to full strength. Trust within the sports medicine team may be necessary for this to facilitate the process (Niven, 2007). “I trusted the physiotherapist and when he said I could do more I pushed myself even though I thought I couldn’t. I knew he wouldn’t injure me further”. However, an alternate rationale may be that young male athletes are often socialised into reducing the affect of an injury and encouraged or pressured to ‘play through the pain’ (Roderick, Waddington, & Parker, 2000). Similarly the hegemonic ideal of masculinity encourages continuation to perform when in pain (Young, McTeer, & White, 1994). Further research is needed to ascertain the affect of

masculinity on the rehabilitation process, and whether gender or personality factors moderate this process.

Some attention needs to be paid to the maladaptive use of avoidance coping by the athletes in this study. Following initial injury Player 2 quoted “I went for a massive blow out for a few days after being told about the injury. I really didn’t give a shit. I’d go out drinking till early in the morning .... I didn’t have to worry about training or who I was playing next week. All I had to worry about was how I was getting home and making sure that I didn’t fall over”. Avoidance of this nature has been widely acknowledged within the literature to have detrimental effects (Kim & Duda, 2003). Blalock and Joiner (2000) suggest that behavioural avoidance coping was not related to fluctuations in depression or anxiousness, however continued behavioural avoidance could have serious consequences for the professional athlete’s continuation in sport. Similarly, non-adherence to rehabilitation protocols has also had recent examination (Niven, 2007). Heil (1993) stated that adherence was essential for complete rehabilitation to occur. Niven (2007) noted negative emotions and maladaptive thoughts were central to poor rehabilitation adherence behaviour. In relation to this, players also noted “unwillingness to give 100%” and “going through the motions”. The main rationale behind this was due to the repetitiveness of the rehabilitation exercises (“I’m so bored at the moment. All I do is go training in the gym or the pool, have a bit of physio and that’s it. I just want to get on and do something exciting”). Again an autonomy-supportive environment could be created to reduce this impact (Levy et al., 2008). Findings suggest that an autonomy-supportive environment could be achieved as simply as involving the player in the decision-making process for the rehabilitation program.

Further research is necessary to fully understand how athletes use avoidance coping to facilitate their rehabilitation from injury. It is suggested that an in-depth

quantitative analysis is conducted to provide a more generic understanding of the issues. In conjunction with this further exploration of the actual effectiveness of this form of coping needs addressing. Nicholls et al. (2006) noted that effectiveness of coping strategies varied greatly and therefore a range of coping strategies should be employed.

Although no specific measure of changes to avoidance coping strategies over the duration of the rehabilitation process was taken, some initial observations can be discussed. Career or personal development plans (e.g., learning a foreign language) were employed early in the rehabilitation process and these continued throughout the duration of the rehabilitation and were still being developed after return to competition. Strategies contained within the 'Maladaptive Behaviours' higher order theme lasted for much shorter durations, and occurred most frequently following initial injury and early within the rehabilitation process. Further quantitative measures need to be utilized to assess these changes over time.

The current study is limited by the use of a small homogenous group of professional athletes. Also, these concepts need to be investigated further within a wider athletic population. The impact of long-term injury, and the medical and rehabilitation services available could be significantly different between sporting populations, which could affect the effectiveness of the coping strategies utilized. Similarly a lack of opportunity for alternate work within the sporting organization could negate some of the findings from this study.

### Conclusion

The results of this study highlight the use of avoidance coping by injured professional rugby union players, and suggest that this form of coping can be beneficial to the rehabilitation process. Avoidance coping in this respect is not just important to control short-term, emotional states but can also have long-term benefits. In addition, the results of the present study appear to support Wrosch et al. (2003b) in that



commitment to alternative goals can be an adaptive coping strategy during the injury rehabilitation process. For example, those involved with the rehabilitation of long-term injured professional athletes may benefit from encouraging them to undertake alternate work within the organization, with increased benefits appearing to come from performance analysis involvement. This employment may also diminish negative affects of isolation during the rehabilitation and also encourage social interaction.

## CHAPTER 7 – STUDY 4

## Self-Determined Motivation in Rehabilitating Professional Rugby Union Players

Cognitive appraisal models (Brewer, 1994; Wiese-Bjornstal et al., 1998) and stage models (Kübler-Ross, 1969; Pedersen, 1986) have both attempted to assist understanding of the psychological processes experienced as a consequence of sports injury. However, Podlog and Eklund (2007a: p542) suggest that self-determination theory (SDT) provides “a comprehensive perspective on the salient issues facing athletes returning to sport from injury”. Ryan and Deci (2000) propose that motivational states subsist along a self-determination continuum, ranging from amotivation (i.e., lack of behavioural intention) to intrinsic motivation (i.e., engaging in an activity for personal reasons). An individual’s positioning on the continuum is defined by their needs for competence, relatedness and autonomy (Ryan & Deci, 2000). Increases in autonomous motivation have led to improved positive emotions (Vallerand & Losier, 1999), higher levels of persistence (Pelletier et al., 1988) and increases in mental health (Frederick & Ryan, 1993). Two main findings have been identified relating SDT to sports injury rehabilitation (Podlog & Eklund, 2007a): (1) more intrinsically motivated rehabilitation climates will improve well being and athlete health; (2) the motivational climate experienced will influence health, well-being and performance in a different manner.

Within sports injury rehabilitation settings the need for autonomy is of prime importance (Podlog & Eklund, 2010) and can be developed by significant others providing an autonomy-supportive environment (Taylor & Marlow, 2001). Autonomy is characterized by an internal locus of control and the perception that behaviours are self-regulated or personally endorsing (Podlog & Eklund, 2007a). This implies that those working with injured athletes allow them input into the decision making processes related to the rehabilitation, as a method to facilitate positive rehabilitation behaviour.

Podlog and Eklund (2006) suggest that injured athletes may benefit from having some control over speed of the rehabilitation, predominantly by reducing negative emotions. Increased autonomy has led to more positive emotions and cognitions in rehabilitation settings (Podlog & Eklund, 2007b), while a lack of autonomy may increase negative consequences and emotions of injury (Bianco, 2001; Grove & Gordon, 1995). A reduction in autonomy can be developed by augmented pressure to return quicker than the injured athlete is physically or psychology prepared (Crossman, 1997). Specific individuals (i.e., the sports medicine team) can assist in developing autonomy by providing choice, reducing control and showing empathy (Williams et al., 1998). Niven (2007) expressed a need for those providing physical therapy to injured athletes to structure the rehabilitation to meet the needs of the performer and to allow the injured athlete input into the process. In particular, physiotherapists should “instil responsibility in the athlete so that they will become accountable for their rehabilitation behaviour” (Niven, 2007: p106). Autonomy support can encourage behavioural engagement by increasing intrinsic motivation (Levy et al., 2008). Within general health literature perceived autonomy support is associated with greater adherence to the rehabilitation protocol (Williams et al., 1998).

Competence is an individual’s perception of proficiency in performance (Kilpatrick et al., 2002). Research into the psychology of injury has highlighted concerns about physical competency to be common within rehabilitation (Bianco et al., 1999; Tracey, 2003). Increasing intrinsic motivation and self-efficacy can develop competency (Ryan & Deci, 2000). Gaining confidence in the injured body part and in general fitness is important to the development of competence for rehabilitating athletes (Evans et al., 2000). This competence can be facilitated within rehabilitation settings by the development of an effective goal setting programme (Evans & Hardy, 2002). Goal setting has much supporting research in injury rehabilitation for increasing self-efficacy

and adherence (Evans & Hardy, 2002; Theodorakis, Beneca, Malliou, & Goudas, 1997). Realistic goals are needed to develop competence and confidence (Podlog & Eklund, 2006); especially as the injured athlete's performance goals have been disrupted by injury. Wrosch et al. (2003b) emphasize a need for adopting new goals when original performance goals become unobtainable.

Relatedness provides a sense of belonging to the situation (Podlog & Eklund, 2007a). Injured athletes may experience a sense of isolation and removal from the team when injured (Bianco, 2001; Tracey, 2003) and this could affect relatedness (Gould et al., 1997b; Johnston & Carroll, 1998). The social support received by the injured athlete during this period may influence the athlete's perceptions of relatedness (Podlog & Eklund, 2006). Social support from a range of sources may well be essential for successful return to sport following injury (Bianco & Eklund, 2001). Medical staff offer support by discussing the rehabilitation with the athlete (Morrey et al., 1999), teammates can be used as role models (Corbillion et al., 2008), and coaches can offer encouragement and support making the athlete still feel part of the team (Podlog & Eklund, 2006). Perceiving that there is still a connection to the team may reduce feelings of isolation (Podlog & Eklund, 2007b) and act as a driver to return to competition (Podlog & Eklund, 2006).

The impact of SDT within sports injury settings has only recently been discussed within the literature, with the majority of research concentrating on return to competition (Podlog & Eklund, 2006; 2007a; 2010). Expanding on current practice within injury rehabilitation, this research utilizes a mixed methodological approach concurrent with the athlete's rehabilitation through the physical rehabilitation process, to return to competition. The crucial aspect in justifying a mixed methodology is that the combination of methods focuses on the strengths of each single method. By using a combination of methods at various points in the research process, the researcher can

build on the strength of each and minimise the weaknesses of a single method approach. A mixed-method can increase both the validity and the reliability of the data (Frechtling & Sharp, 1997). In particular the present study investigated longitudinally the rehabilitation from anterior cruciate ligament (ACL) injury in professional rugby union athletes and how the principles of SDT (autonomy, competence, relatedness) influenced this process during the early rehabilitation, late rehabilitation and return to play stages.

## Method

### *Participants*

Five professional rugby union players, who had suffered anterior cruciate ligament (ACL) injury that required surgical intervention committed to this study. See Table 1 for full participant demographics.

Table 1 – Participant Demographics

<b>Player</b>	<b>Age</b>	<b>Position</b>	<b>Length of Time Prior to Surgery</b>	<b>Length of Rehabilitation</b>	<b>Suffered Previous Severe Injury</b>
1	23	Backrow Forward	4 weeks	11 months	Yes
2	27	Backrow Forward	3 weeks	6 months	Yes
3	27	Fly Half	2 weeks	8 months	No
4	18	Full Back	2 weeks	12 months	No
5	24	Centre	4 weeks	12 months	Yes

### *Procedure*

This was a longitudinal investigation conducted concurrently with each player's injury rehabilitation. Following university ethical approval, initial contact was made with each player prior to them undergoing reconstructive surgery and within two weeks of the anterior cruciate ligament injury being identified. The methodological procedure was split into three distinct phases of the injury and subsequent rehabilitation, expanding on research conducted by Shelley (1999), to cover (1) Early Limited

Participation – detailing the early part of the rehabilitation programme, where the emphasis is on regaining the full range of movement in the knee joint and muscle strength; (2) Late Limited Participation – detailing the final part of the rehabilitation programme, where emphasis is on more sport specific training and the final preparation for full fitness; (3) Return to Play – detailing the final training sessions before returning to competitive action and the first three games of competition after full rehabilitation.

A mixed methodological approach was undertaken concurrent with each player's rehabilitation, comprising of semi-structured interviews, a self-report diary and three established questionnaires related to SDT and social support. This approach consisted of a dominant (qualitative) – less dominant (quantitative) design as suggested by Tashakkori and Teddle (1998). The semi-structured interview guides, as utilized by Podlog and Eklund (2006) focused on the player's cognitions, emotions and coping strategies experienced during the rehabilitation, as well as the perceived control and support provided to them, and were based on previous literature (e.g., Albinson & Petrie, 2003; Gould et al., 1997b). Twice monthly interviews, utilizing the semi-structured guides and lasting on average 30-45 minutes in duration, were conducted with each player concurrent with his rehabilitation. In addition each player was asked to complete a pre-designed, self-report diary to allow them to record day-to-day changes related to their emotions and coping strategies. Specifically each player was instructed to record both positive and negative emotional changes, and indicate the strategies utilized to cope during the rehabilitation related to both the injury and life in general. Diaries allow for a more extensive investigation (Nicholls et al., 2006) as they can reduce the time between the event and recall. The use of personal documents, such as diaries, enables the participant to provide detailed information relating to them personally that they may be unwilling to discuss in other forums (Fetterman, 1989). In addition, three established questionnaires were completed following successful return to

competition to ascertain the social support and perceived autonomy-support provided during the rehabilitation. These were the MOS Social Support Survey (MOS-SSS, Sherbourne & Stewart, 1991), which enabled the identification of various forms of social support (Emotional / Informational support; Tangible support; Affectionate support; Positive Social Interaction) offered during the rehabilitation, and two questionnaires adapted from the Sport Climate Questionnaire (part of a group of questionnaires used to identify Perceived Autonomy-Supportive Climates; Deci & Ryan, n.d.). These questionnaires are designed to assess to what degree the climate established is autonomous or controlling. The final two questionnaires investigated the climate established by the coach (Sport Climate Questionnaire) and by the physiotherapist (Injury Rehabilitation Questionnaire; which replaced the word 'coach' with 'physiotherapist') during the rehabilitation process.

#### *Data Analysis*

Each interview was audiotaped and transcribed verbatim and a hierarchical content analysis, as suggested by Patton (1990), was conducted on the transcripts and diary entries. Utilizing guidelines by Tesch (1990) a detailed examination of the data to identify topics that best describe particular segments of text was conducted, followed by a determination of common features that characterize the text segments in order to create and understand the relationship between topics. Specifically the following five-step process was applied: (1) All interviews and diary entries were read and reread to allow the analyzer to obtain familiarity with them; (2) Significant statements and phrases that directly related to social support, autonomy, competence and relatedness were extracted; (3) These significant statements were arranged with similar terms to form raw data themes for each phase; (4) These raw data themes were then integrated into higher order themes by which the experience was described; (5) Ultimately, all higher order themes from each player were compared, in order to examine the common

themes endured. These common themes are of the greatest generality, meaning that no links could be uncovered among these themes.

No statistical analysis was completed on the quantitative data rather it was utilized to triangulate with the qualitative data to assist with the confirmation or rejection of the themes identified. Combining data sources allows for a more holistic view of the main factors and reduces the possibility of inaccurate interpretations of the qualitative data being attained (Frechtling & Sharp, 1997). This triangulation of different data sources increased the trustworthiness (Lincoln & Guba, 1985) of the analysis conducted. Creswell (2003) noted concurrent analysis of different data sources assists building a dependable rationalization for the identified themes. Credibility was further developed by prolonged engagement, member checking, peer debriefing and negative case analysis.

### Results and Discussion

Content analysis was conducted separately on the early limited participation phase, late limited participation phase and return to play phase, and split into the general dimensions *Autonomy*, *Competence* or *Relatedness*. The early limited participation phase identified 26 raw data themes coalesced into the 10 higher order themes *Positive Self-Regulation*, *Positive Locus of Control*, *Negative Self-Regulation*, *Negative Locus of Control (Autonomy)*; *Positive Physical Ability*, *Negative Physical Ability*, *Negative Performance Ability (Competence)*; *Positive Team Interaction*, *Positive Medical Interaction*, and *Negative Team Interaction (Relatedness)*. See Figure 6

The late limited participation phase highlighted 25 raw data themes, with the higher order themes *Positive Self-Regulation*, *Positive Locus of Control*, *Negative Self-Regulation*, and *Negative Locus of Control* forming the general dimension *Autonomy*; *Positive Physical Ability*, *Positive Performance Ability*, *Negative Physical Ability*, and *Negative Performance Ability* comprising the general dimension *Competence*; and



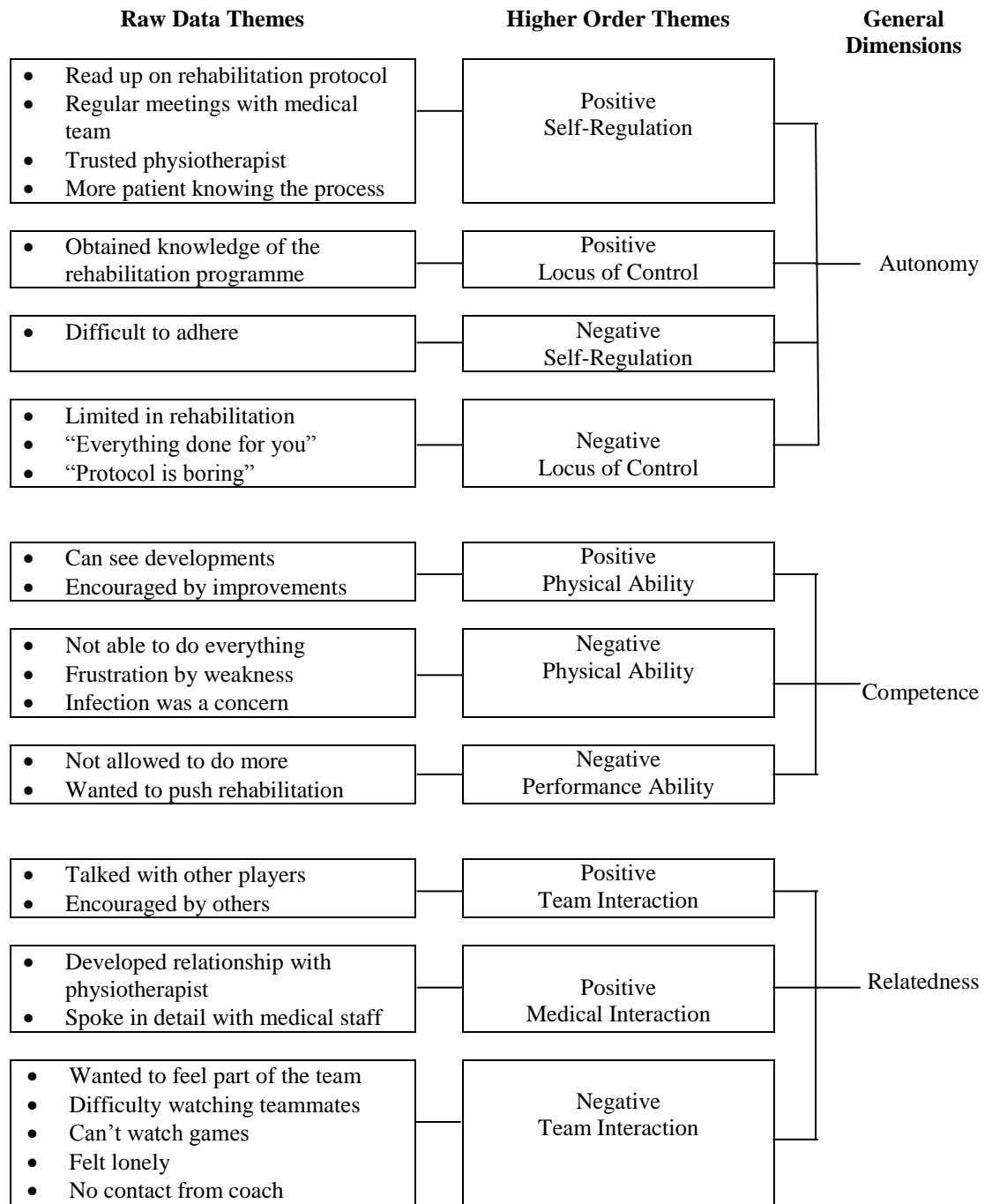


Figure 6 – Early Limited Participation Phase

*Positive Team Interaction, Positive Medical Interaction, and Negative Team Interaction forming Relatedness. See Figure 7.*

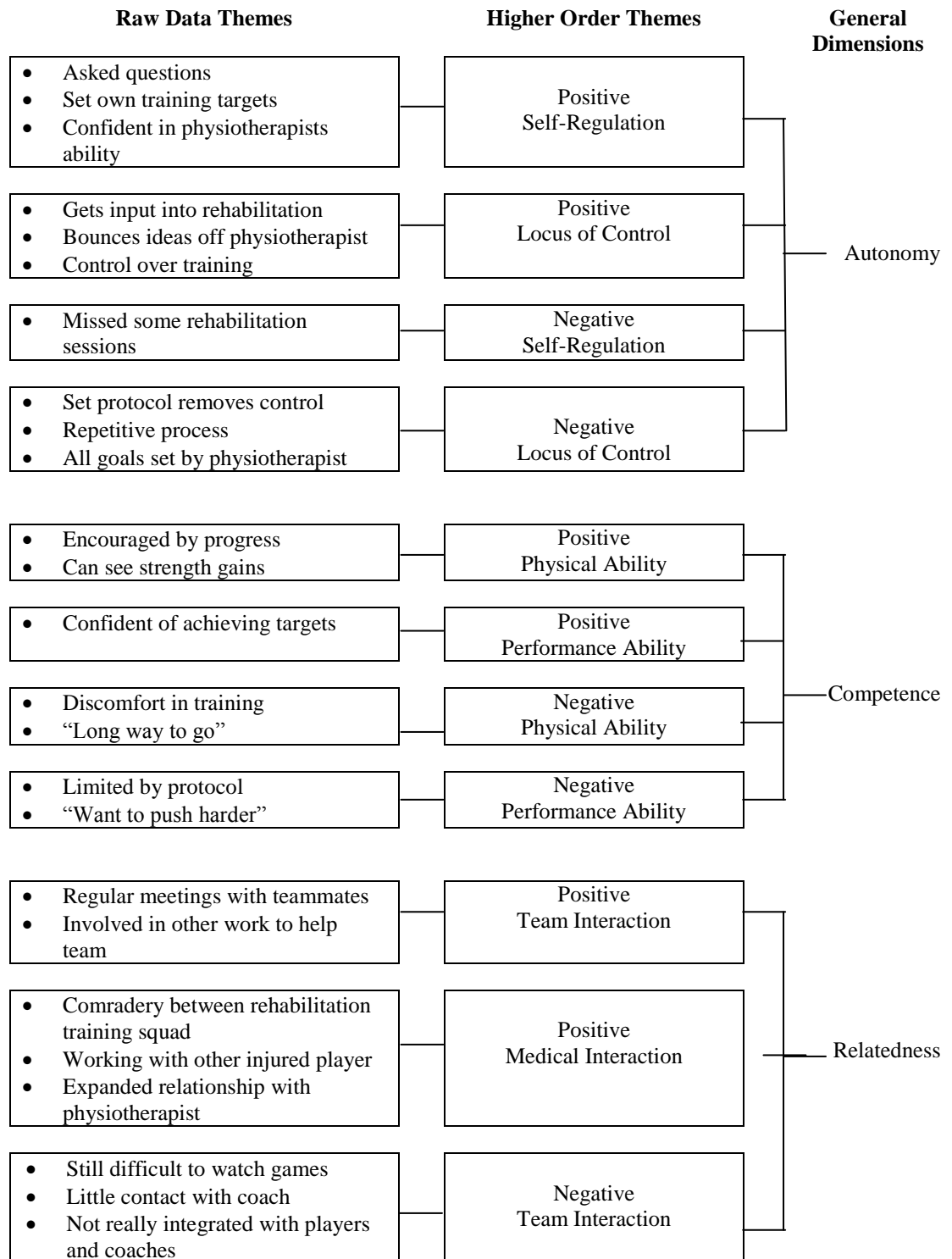


Figure 7 – Late Limited Participation Phase

The return to play phase identified 24 raw data themes combined into nine higher order themes. *Autonomy* was formed by *Positive Self-Regulation*, *Positive Locus of Control*, and *Negative Self-Regulation*; *Competence* comprising of *Positive Physical Ability*, *Positive Performance Ability*, *Negative Physical Ability*, and *Negative*

*Performance Ability; and Relatedness including Positive Team Interaction and Positive Medical Interaction. See Figure 8.*

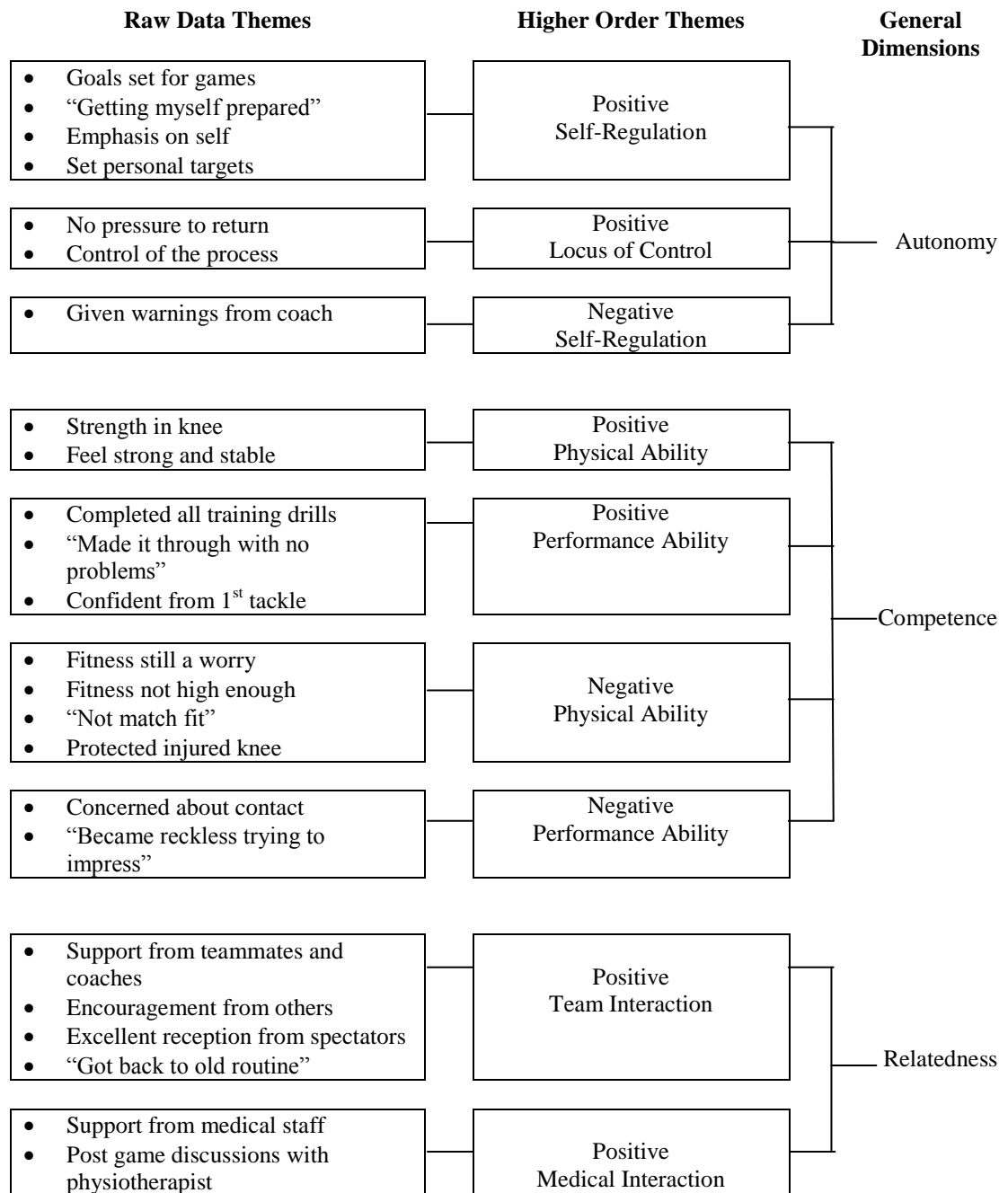


Figure 8 – Return to Play

Full results from the MOS-SSS, Sport Climate Questionnaire, and Injury Rehabilitation Questionnaire are presented in Table 3. The higher the average score the greater amount of support and autonomy being perceived.

Table 3 – Questionnaire Results

Player	MOS-SSS				Sport Climate Questionnaire	Injury Rehabilitation Questionnaire
	Emotional Support	Tangible Support	Affectionate Support	Positive Social Interaction		
1	4.625	4.75	5	4	5.6	7
2	4.75	5	5	5	7	7
3	4.625	5	5	5	7	6.33
4	4.125	4.75	4	4.33	5.46	6.33
5	3.75	3	5	3.67	1	7

The aim of the present study was to identify how the constructs of SDT impact rehabilitation of professional rugby union players and to ascertain how this support assisted rehabilitation and subsequent return to play. The results are discussed independently for the each of the three phases identified.

#### *Early Limited Participation Phase*

Of principle importance to all players was the need to understand the rehabilitation process and become personally involved in it (“Having an understanding of [the rehabilitation programme] allows me to become engrossed in it”; “I’m more patient knowing the process. Knowing what I can and can’t do”; “I am clear on what I want to get out of the next few weeks”). Within general health psychology increased personal control has led to more adaptive coping responses being utilized (Heijmans, 1999) and gathering more information about the process has facilitated rehabilitation of athletes suffering musculoskeletal injury (Hagger et al., 2005). Increases in self-regulation have been shown to benefit persistence (Pelletier et al., 1988) and adherence (Levy et al., 2008). Niven (2007) suggests that the physiotherapist can assist in providing an autonomy supportive climate by initially establishing a relationship with the injured player and increasing the player’s confidence in both the physiotherapist and the programme. Each player commented on the need to trust the physiotherapist and the importance of having regular meetings with all involved in the rehabilitation (“I had

regular meetings with [physiotherapist] and my fitness coach, allowing me to have some input into each session. I was involved in my rehabilitation, which was good”; “I like the way [physiotherapist] allows me lots of control of what I’m doing. It’s not that I go off on my own and just do what I want, but he involves me with almost everything. It really helps to keep my interest on the job in hand and stops me from worrying about my knee and how long I’m going to be out for”). All players stated they ‘strongly agreed’ with the statements ‘*I feel understood by my physiotherapist*’ and ‘*I am able to be open with my physiotherapist*’ on the Injury Rehabilitation Questionnaire. Williams et al. (2002) noted to assist in development of autonomy each player should be allowed a considerable input to the decision making process. However, the restrictive nature of some ACL rehabilitation protocols (Shelbourne & Nitz, 1990; Shelbourne & Rowdon, 1994; Shelbourne & Wilckens, 1990) may be debilitating for these injured players, as they limit the control each player has over the rehabilitation. Player 4 commented, “I would like some more control over what I’m doing. I lose some motivation when I’m constantly doing the same thing. The physio lets me decide on some of the exercises, but in terms of leg strengthening all the exercises are quite similar and a bit boring” and “It’s so frustrating. I feel so helpless. The rehab is just boring and repetitive”.

Seeing developments and improvements in physical ability assisted in developing competence. Player 1 stated, “I have seen a gradual improvement in my range of movement, so I am positive I am improving all the time”. These increases in confidence could lead to better rehabilitation (Evans et al., 2000) by focusing the player on the rehabilitation goals and increasing self-confidence (Brewer et al., 2003). Players are increasingly likely to become engaged in the activity when there is a high level of self-confidence (Federick & Ryan, 1995). However concerns about physical competency are common with rehabilitating athletes (Tracey, 2003). Frustration can become a factor when players are unable to reach the set targets (“It’s hard to see the

gap between now and when I get to play again being bridged, so it's frustrating with lack of mobility and poor strength of my knee"; "Although it's good to be doing some activity again, it's frustrating not being able to do as much as I want"). The impact of set ACL rehabilitation protocols may again have an impact at this early stage of rehabilitation. In many cases these protocols are highly structured stating weekly training targets, allowing little flexibility for individual performers ("I'm so bored at the moment. All I do is go training in the gym or the pool, have a bit of physio and that's it. I just want to get on and do something exciting").

Athletes with serious injury are more likely to seek social support (Green & Weinberg, 2001) and developing a relationship with the physiotherapist may reduce the psychological trauma experienced (Hagger et al., 2005). Scores from the Injury Rehabilitation Questionnaire highlight the good relationship each player gained with their physiotherapist, with average scores ranging from 6.33 to 7 out of a maximum of 7. Robbins and Rosenfeld (2001) noted that medical providers offer the most support to injured players. Player 5 commented, "[physiotherapist] was really good. He answered all my questions and gave me information that I could understand". Teammates are also an important part of the social support network (Johnston & Carroll, 1998; Podlog & Dionigi, 2010) and are most regularly available to provide support (Corbillion et al., 2008). All players stated that they spoke with others who had suffered the same injury or a similar severe injury and took encouragement and inspiration from those who had successfully rehabilitated. The use of teammates as role models has been identified as facilitative to the rehabilitation process (Flint, 1999; Mitchell, 2011). Although research suggests that it is important for injured players to maintain contact and be involved with the team, it is possible for them to have feelings of isolation (Gould et al., 1997b). Comments from players included, "My only negative is having to watch the other guys training outside. I still want to be part of the squad but it's hard seeing it from the gym

all the time” and “It’s a bit lonely really. It’s not like when you train with the boys, because most of the time I’m doing things on my own”. Similar comments from the players highlight the frustration that can be experienced by not being around teammates (Podlog & Eklund, 2006). Podlog (2006) recommends that coaches provide opportunities for the injured player to interact with the rest of the team. Player 5 had a number of difficulties with the lack of support provided to him by his coach (“I haven’t heard much from the coach. It’s annoying but I wasn’t expecting to have a huge amount of contact with him. There’s some other stuff going on in the club that affects him more”). The Sport Climate Questionnaire was scored at the lowest possible value by this player, indicating he perceived no support from his coach. Although the coach may try to keep emotional distances from players to reduce the chances of favouritism being perceived (Rosenfeld, Richman, & Hardy, 1989), in this case the coach appears to be more self concerned (the coach was sacked while this player was still injured), which had a negative impact on the injured player’s emotions and behaviour. This is highlighted in the interviews with the player noting he was worried if a new coach was appointed and he was “trying to rush through” his rehabilitation.

#### *Late Limited Participation Phase*

Increased autonomy in the rehabilitation was experienced by all players during the late limited participation phase, with elevations in both self-regulation and locus of control (“At times in the early stages it could get very repetitive and sometimes boring, but as it gets closer and closer to the pitch it motivates me more”; “I’ve suffered what I thought was a pretty big setback ... I got some reassurance from the medical team. I was quite relieved. Now I am back on track, trying to do everything I can to help myself”). Again asking questions and bouncing ideas off the physiotherapist proved important to the rehabilitation. Within general health psychology this type of active coping increases perceived control of the rehabilitation process (Rutter & Rutter, 2002). Player 3 noted,

“I’m learning more and more about the injury and the best methods to rehabilitate. The medical team probably hate it because I’m asking so many questions”. Skinner and Edge (2002) state autonomy can be developed by allowing rehabilitating players to express themselves and input into the programme. Comments from players included, “The step up in training is great and allowed for some variety. I got to choose whether I was on the bike or in the pool or whatever” and “I set some of my own training targets. Obviously the training staff oversees these and ensure they meet my needs, but I’m involved”. Control over the rehabilitation is suggested to reduce the impact of physical pain, or simply if the treatment is perceived to be effective the injured player can report lower levels of pain experienced (Hagger et al., 2005). Tolerant of pain also results in greater adherence (Fields, Murphey, Horodyski, & Stopka, 1995) and can be moderated by mental toughness (Levy et al., 2006). Players 4 and 5 had a slightly different experience stating, “All [goals] set by the physio. I do have some input into the different exercises. Well that’s what they say, because I don’t think they take it into account” and “There’s no need for me to be involved in goal setting. [The physiotherapist] is a specialist and I trust him”. Although it is suggested that this lack of autonomy can be debilitating to the rehabilitation (Bianco, 2001), further research is required to ascertain the affect of this lack of control compared with the trust in qualified personnel.

Again competence was developed by seeing progressions in the rehabilitation and an increased confidence in the ability to achieve targets. Having realistic short-term goals can develop physical and performance competence (Gilbourne & Taylor, 1998). Brewer et al. (2003) emphasized that greater self-efficacy in rehabilitation increases adherence. The players in the present study with lower self-confidence stated they missed some training sessions or “didn’t give 100%”, while those with increased self-competence reported wanting to push themselves further (“I’ve done a few things that my physio shouldn’t know about to test my knee. I just needed that confidence in my



own ability”). Similarly perceived physical competence is most likely to affect self-esteem when injured (Sonestrom & Morgan, 1989). Players did comment that they were restricted by the ACL rehabilitation protocol (“I had a target to reach each session and it didn’t matter whether I could do more or less than that. When I felt good I wasn’t supposed to push myself further, which annoyed me. I knew I could do more, wanted to, but the medical staff said no”).

Development of comradery between players within the rehabilitation environment was highlighted as facilitative (“Training with another player helps to keep me motivated. I don’t want to let him down”; “Training as part of a rehab team is good. We constantly encourage each other and it boosts you’re confidence when one of the other guys is back playing. Although sometimes it’s a case of how long will I still be here for. Generally the support is really beneficial”). The involvement of significant others has been shown to enhance the relatedness of each player to the rehabilitation (Bianco, 2001; Niven, 2007). High average scores for all players on the MOS-SSS indicate the range of support available. Further group unity may decrease non-adherence (Carron & Spink, 1993) and increase work output (Prapavessis & Carron, 1997). Podlog (2006) identified lack of contact with teammates can increase frustration during rehabilitation. Needing a sense of belonging encouraged three of the players to undertaken alternate work within the club (“to feel part of it again”). Player 1 became involved with video and game analysis, stating “It allowed me to feel part of the team, to be involved, even though I could not physically perform. I’m motivated by being involved, and not only does it take my mind off my knee, it allows me to help the team and even develop my own game”. Having a desire to help the team was also compelling for adhering to the rehabilitation programme and for returning to competition (Podlog & Eklund, 2006). Player 5 struggled initially with the change of coach at the club (“I’m not really integrated with the other players and coaches. We’ve got a new coach at the

club. This is a worry because I don't know them and they don't know me"). However as the new coach began to recognize him as part of the team, his perspective changed ("They've been fantastic really. The new coaches still speaks to me. One of them has been really good, always asking about me and checking to see how I'm getting on. It is nice to have that support when you're not playing. I know some guys who have just been left in the wilderness when they've been injured, like the coaches don't care but it's been really good here"). Research within injury rehabilitation settings has noted the need for the social support being offered to be consistent with the injured player's needs (Bianco & Eklund, 2001; Mitchell, 2011). Corbillion et al. (2008) suggest the coach's behaviour and type of support provided can influence the emotions of an injured player.

#### *Return to Play Phase*

Increased pressure and less control over the return to play can be detrimental to the player (Gagné, Ryan, & Bergmann, 2003). Podlog and Eklund (2005) suggest that a lack of autonomy can lead to a decrease in self-confidence and an increase in anxiety and fear of re-injury for returning players. All players in the present study stated they sensed no pressure to return and felt that they had control over the rehabilitation process. Hagger et al. (2005) noted players with a greater level of perceived control report less hindrance when returning to competition, whilst Bianco (2001) suggests injured players could benefit from having freedom to choose when they return because they are less likely to experience performance failures and / or re-injury. However, it is suggested that caution should be taken to ensure the player does not continually delay the return to play, resulting in exacerbated emotions. Medical staffs have the ability to ensure no conflict is created between the expectations of the coach and the injured player (Podlog, 2006). The use of goal setting has been well documented within sports injury rehabilitation settings (Evans & Hardy, 2002), however little research has been conducted into its benefit to return to play. All players noted the benefit of having goals

set for their return (“I knew I would have a set time to play, so it meant I didn’t have to worry about lasting. I could just go full on until the end”; “Having targets for my involvement meant I wasn’t concentrating on my knee, just trying to do what I needed to”). The goals set ranged from playing specific time periods to needing to be involved in play a set number of times. Further research is needed into the benefits of such goals, however it is suggested that these goals will need to become progressively more difficult (Podlog & Dionigi, 2010), with emphasis on process and performance goals (Evans & Hardy, 2002). The only reported reduction in autonomy came from player 4 who reported being warned by his coach for trying to do too much and not concentrating on the game plan.

Physical competence is an important concern when returning to competition (Podlog & Eklund, 2006). Cox (2002) identified the benefit of passing clinical and sport specific tests to increase competence in the injured body part, and all players stated they had confidence in their knee (“I feel extremely ready to return. My knee feels strong and stable; and has done all through training”; “I’ve been lifting some big weights in the gym ... It’s just given me confidence. I know my knee’s good enough to go, so I don’t have to worry. I’d probably be shying out of tackles if I wasn’t 100%. I’ve just taken control of what I’m doing”). Corroborating previous literature (Bianco, 2001; Tracey, 2003) greater concerns were related to a lack of physical fitness and overall performance (“I’m still nervous about how my fitness will hold up”; “I am very excited about the prospect of playing a game. I’m nervous about how I will perform rather than how my knee will be”). With game time and by utilizing previous performance routines, each player was able to develop their physical competence enabling a successful return to play, at previous performance standards (“The more I played the less I focused on the knee”). High levels of self-confidence encourage players to become engaged (Frederick & Ryan, 1995). Players 3 and 4 both stated they tried to protect their injured knee, by

using some form of strapping or protective sleeve, and both had concerns about contact situations. This could be a predisposed trait or may be the influence of having less prior injury experience. Further research is required to understand the complexities of prior injury knowledge on the return to play.

Relatedness within the return to play phase was positive for these players. Support from teammates and coaches helped to increase confidence (Podlog, 2006) and become integrated with the team (“The coaches and the boys were excellent. The team atmosphere was good and I knew this is where I was supposed to be”). As professional rugby union players, all received an added benefit from the spectators present at their return. Further research is needed to investigate the impact of game location on the return to play, however the players who returned during a home game made more comments regarding this (“I got a welcoming reception from the crowd and was over the moon to be back on a competitive pitch again”; “It was awesome having the first game at home. The crowd noise was brilliant and I got such a cheer when my name was called, it really pumped me up, really focused me”). The physiotherapist was also a valuable source of support during the return to play phase. Prior to competition the physiotherapist reassured each player that their injured knee was strong, and post-game they ensured each player cared for their injured knee correctly (“I spoke to the physio and he explained that all the preseason work and training I’d done was better preparation and more rigorous than any test”; “[physiotherapist] came straight up to me after the first game to check how my knee was. He told me to make sure that I iced it to stop any soreness”).

The generalization of these findings is limited by the small sample size, a characteristic that is common within qualitative research in general. As such it is recommended that similar research be conducted with larger numbers of participants in order to validate the higher order themes identified. Although professional sports, in

general, have high levels of medical support available the support received by these players may not correspond to that received within other organizations. Further research is suggested across a range of professional sports to understand the benefits of self-determined motivation for injured elite level performers.

### Conclusion

Developing autonomy, competence and relatedness during rehabilitation appears to facilitate effective return to competition. Self-determination was associated with adaptive coping strategies and increased adherence to the process (Hagger et al., 2005). Specifically, providing players with an in-depth understanding of the injury can increase self-regulation and provide a greater sense of control throughout the rehabilitation. Competence is developed during each phase with each player increasing physical and performance proficiency to greater extents as they progress. Meeting and achieving training targets boost confidence and players may benefit by experiencing more success throughout the early stages of rehabilitation. The physiotherapist acts as an essential source of social support to injured players, however the player's coach may facilitate relatedness by encouraging the injured player to be involved with the team. In such ways the injured player may still feel part of the team despite not being able to physically perform.

## CHAPTER 8 – STUDY 5

## Anterior Cruciate Ligament Injury Rehabilitation: A Psychological Case Study of a Professional Rugby Union Player

Injury rates have increased significantly in Rugby Union over the last decade (Bathgate et al., 2002; Brooks et al., 2005). The consequences of such injuries and how a player deals with injury are important to continuation in and return to the sport. The majority of literature that has focused on injury rehabilitation has concentrated on the medical and physical aspects and until recently has neglected the psychological factors that could potentially play a significant role for professional athletes. The psychological research to date has mainly concentrated on specific factors that influence an athlete's rehabilitation such as; social support (Bianco, 2001; Udry, 1997); adherence (Duda, Smart, & Tappe, 1989; Pizzari, McBurney, Taylor, & Feller, 2002); self-confidence (Magyar & Duda, 2000); coping (Gould et al., 1997b); and psychological skills (Cupal & Brewer, 2001; Ievleva & Orlick, 1991). A limitation of much of this research is that a large percentage has adopted retrospective research designs and as such some important information could have been missed. In particular, retrospective approaches can be influenced by the event outcomes achieved by the athlete and this can lead to casual conclusions being made (Brewer et al., 1991). Also, retrospective approaches can result in athletes reporting how they normally behave rather than how they actually behaved in a particular situation (Smith, Leffingwell, & Ptacek, 1999). Finally, memory decay can reduce the accuracy of data collected retrospectively (Ptacek, Smith, Espe, & Raffety, 1994).

Cognitive appraisal models of injury rehabilitation (Brewer, 1994; Wiese-Bjornstal et al., 1998) suggest individual interpretation of the injury will influence the athlete's cognitive, emotional and behavioural response. Gallagher and Gardner (2007) suggest that cognitive appraisal, incorporating both personal and situational factors, is

the key to the emotions and behaviour related to sports injury. Both primary and secondary appraisal do fluctuate dependent on personal and situation factors of each injured athlete (Tracey, 2003) however there are significant relationships between primary and secondary appraisals and coping strategies (Albinson & Petrie, 2003). A linear association has been identified between appraisal, affective states and behaviour (Gallagher & Gardner, 2007). Albinson and Petrie (2003) found that unhelpful coping strategies lead to greater stress when injured and propose that the social support provided to an injured athlete should focus on reducing negative appraisals. In general coping strategies have been separated into three distinct categories a) problem-focused, b) emotion-focused, and c) avoidance coping (Kowalski & Crocker, 2001). Problem-focused coping relates to concerted efforts to manage a stressful situation; Emotion-focused coping is aimed at controlling emotional reactions; and Avoidance coping is concerned with activities or cognitive changes to avoid the situation via distraction or social diversion (Endler & Parker, 2000).

Shelley (1999: p. 306) called for further investigation into the “unique perceptions and perspectives” experienced by injured athletes contemporaneous with rehabilitation, as a method for adding depth to the research. The use of qualitative data collection on multiple occasions allow injured athletes to reflect on their experiences as they happen and to scrutinize changes over time (Brewer, 1994; Heil, 1993; Podlog & Eklund, 2006; Udry, 1997). Mixed methodological approaches aid the investigation of specific components associated with the psychology of injury rehabilitation identified within current literature, in particular emotional response (Tracey, 2003), coping (Gould et al., 1997b), social support (Bianco, 2001) and perceived autonomy (Podlog & Eklund, 2005).

To date relatively little research has investigating the psychological impact of injury and rehabilitation with professional athletes. In particular, the present study

investigated the rehabilitation of an athlete who suffered an anterior cruciate ligament (ACL) injury. This was done for three reasons. First, ACL injury is common in the sport of rugby (Brooks et al., 2005), and in numerous other sports. Secondly, the rehabilitation generally takes a substantial period of time and is known to lead to significant distress in athletes (Pizzari, Taylor, McBurney, & Feller, 2005). Thirdly, much of the literature available to date has investigated ACL rehabilitation allowing meaningful comparisons (Cupal & Brewer, 2001; Brewer et al., 2000).

In conclusion, the aim of the present study was to longitudinally investigate the psychological aspects associated with rehabilitation from an ACL injury adopting a mixed-methodology design. By the investigation of coping strategies along side emotional reactions, the present study aimed to provide a more holistic view of cognitive appraisal related to serious sports injury.

## Method

### *Participant*

The participant in this study is currently a professional rugby union player. “Tom” (a pseudonym) ruptured an anterior cruciate ligament (ACL), during a preseason friendly match, when in the process of being tackled he got twisted around while his leg stayed planted in the ground. He continued to play for the duration of the match and only realized the extent on his injury the following evening when, after a recovery run, his knee stiffened up badly and became very painful. The full diagnosis of Tom’s injury did not occur until one month after the initial incident. He was undergoing an MRI scan in which it was anticipated that some damaged cartilage would be removed, however when the full extent of his ACL injury was identified his consultant immediately suggested surgery to reconstruct the damaged ligament. From the reconstructive surgery to his injured ACL, Tom spent 11 months in rehabilitation.



Tom had previously suffered from a ruptured posterior cruciate ligament (PCL) on the same knee as the current ACL injury and had missed most of the previous season's competitions. He had successfully returned to competitive action after six months in rehabilitation and had suffered no further problems until the ACL injury occurred. During his ACL reconstruction, it was identified that his PCL had completely healed and no further attention was required for this.

### *Procedure*

This was a longitudinal investigation conducted concurrently with the athlete's injury rehabilitation. Following university ethical approval initial contact was made with the athlete prior to him undergoing reconstructive surgery and within two weeks of the anterior cruciate ligament injury being identified. The methodological procedure was split into six distinct phases of the injury and subsequent rehabilitation, expanding on research conducted by Shelley (1999), to cover (1) Initial Injury – detailing the actual occurrence of the injury and the diagnosis of the severity of the injury; (2) Pre-Surgery – detailing the days leading up to the surgical reconstruction, including the actual surgery; (3) Post-Surgery – detailing the first few days following the reconstruction and the athlete's initial attempts to regain movement within the knee joint; (4) Early Limited Participation – detailing the early part of the rehabilitation programme, where the emphasis is on regaining the full range of movement in the knee joint and muscle strength; (5) Late Limited Participation – detailing the final part of the rehabilitation programme, where emphasis is on more sport specific training and the final preparation for full fitness; (6) Return to Play – detailing the final training sessions before returning to competitive action and the first three games of competition after full rehabilitation.

A mixed methodological approach, principally combining qualitative and quantitative methods, was utilized for this study. This approach consisted of a dominant

(qualitative) – less dominant (quantitative) design as suggested by Tashakkori and Teddle (1998). Tom was interviewed on a regular (every two / three weeks) basis, utilizing a semi-structured interview guide as suggested by Patton (1990), regarding his thoughts, feelings, emotions, and coping strategies utilized during his rehabilitation. An interview guide was established for each phase of the rehabilitation, utilizing the vast range of current research on the subject and the researchers' personal experience of ACL injury. Each interview on average lasted 45 minutes and the information was audiotaped and transcribed verbatim.

Tom was also asked to complete a pre-designed diary, allowing him to record all day-to-day changes in emotional responses (both positive and negative) and state coping strategies utilized throughout the rehabilitation that related to both the injury itself and life in general. The use of personal documents, such as diaries, enables the participant to provide detailed information relating to them personally that they may be unwilling to discuss in other forums (Fetterman, 1989).

Tom completed six established questionnaires at specific times during his rehabilitation, to assist with the confirmation of any significant data that may emerge through the qualitative data collection methods. The Emotional Responses of Athletes to Injury Questionnaire (ERAIQ; Smith et al., 1990) was completed immediately after diagnosis of the severity of the injury. The ERAIQ identifies athlete's emotional responses to injury and is used to assess the injured athlete's psychosocial response to injury. Smith et al. (1990: p.23) states that "the ERAIQ is a blueprint for the comprehensive assessment of an injured athlete". The Sports Inventory for Pain (SIP) questionnaire (Meyers et al., 2003) was completed following the reconstructive surgery. The SIP is a 15-item sport specific measure of how different athletes respond psychologically when in pain. Answers on each item are then categorised into three groups (Direct Coping, Catastrophizing, and Somatic Awareness). The Coping with

Health, Injuries, and Problems (CHIP) inventory (Endler & Parker, 2000) was completed in the early stages of the late limited participation phase. The CHIP provides a score for four subscales related to coping (Distraction coping; Palliative coping; Instrumental coping; Emotional Preoccupation), which allowed for triangulation of utilized coping strategies discussed during the interviews. Following a successful return to competition Tom was asked to complete the MOS Social Support Survey (MOS-SSS, Sherbourne & Stewart, 1991), which enabled the identification of various forms of social support (Emotional / Informational support; Tangible support; Affectionate support; Positive Social Interaction) offered during his rehabilitation. The final two questionnaires were both adapted forms of the Sport Climate Questionnaire (part of a group of questionnaires used to identify Perceived Autonomy-Supportive Climates; Deci & Ryan, n.d.). These questionnaires are designed to assess to what degree the climate established is autonomous or controlling. The final two questionnaires, completed after full rehabilitation, investigated the climate established by the coach (Sport Climate Questionnaire) and by the physiotherapist (Injury Rehabilitation Questionnaire) during the rehabilitation process.

All data were collected simultaneously, allowing for concurrent analysis of different data or triangulation of data sources. The aim of using a combination of data collection methods is to increase the validity and reliability of each method and to remove or reduce any weaknesses caused by a single data collection method (Frechtling & Sharp, 1997).

### *Data Analysis*

All interviews were audiotaped and transcribed verbatim producing 60 single-spaced pages of raw data. A hierarchical content analysis, as recommended by Patton (1990) and adapted to sport by Scanlan, Stein, & Ravizza (1989) and Gould, Eklund, & Jackson (1993) was then used to analyze the interview findings and the completed

diaries. A detailed examination of the data to identify topics that best describe particular segments of text was conducted, followed by a determination of common features that characterize the text segments in order to create and understand the relationship between topics, as suggested by Tesch (1990). Specifically the following five-step analysis procedure was utilized: (1) All of Tom's oral and written descriptions of his injury experience were read to allow the analyzer to obtain a familiarity for them; (2) From the transcripts, significant statements and phrases that directly pertained to athletic injury were extracted, for all six phases being investigated; (3) These significant statements were arranged with like terms to form raw data themes for each phase; (4) These raw data themes were then integrated into higher order themes by which the frequent elements experienced during the rehabilitation process were described; (5) Finally, all higher order themes were compared and categorized into one of two general dimensions (Influential Emotions or Coping Strategies). These general dimensions are of the greatest abstraction, meaning that no links could be uncovered among these themes.

The quantitative data were triangulated with the qualitative data to assist with the confirmation or rejection of the themes identified. The major benefit of using this form of mixed methodological approach is that it allows the researcher to obtain a more holistic view of the main factors and reduces the possibility of inaccurate interpretations of the qualitative data being attained.

### Results and Discussion

Content analysis was conducted for each phase of the rehabilitation and split into the general dimensions of Influential Emotions (In. Em.) or Coping Strategies (C. S.). Initial injury phase composed of five higher-order themes; *Shock, Helplessness, Depression / Frustration, Anger* (In. Em.) and *Information Gathering* (C.S.) (see Figure 9).

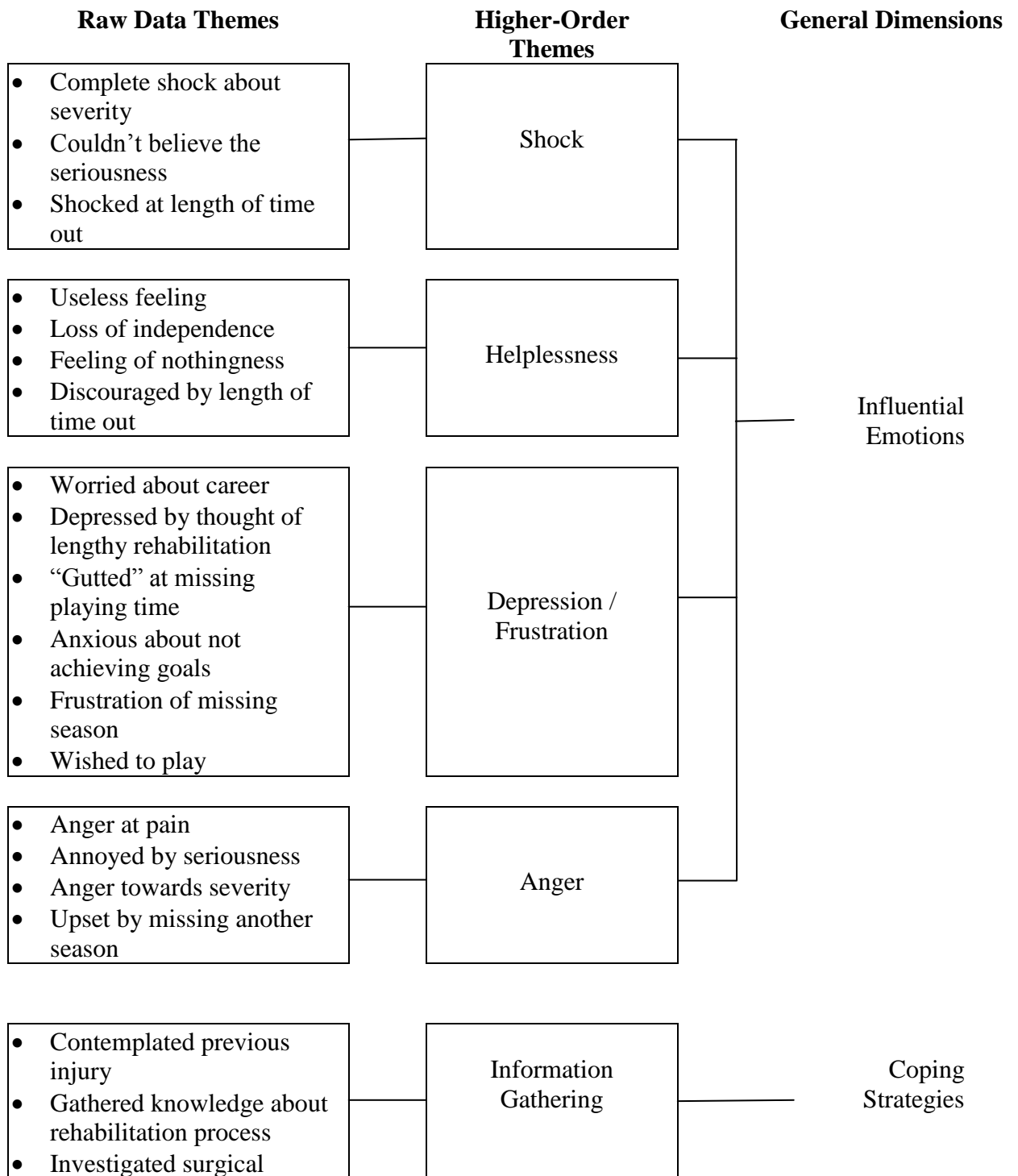


Figure 9 – Initial Injury Phase

Pre-surgery phase coalesced seven higher-order themes; *Apprehension, Anger, Depression / Frustration* (In. Em.) and *Problem-Focused Coping, Emotion-Focused Coping, Avoidance Coping, Social Support* (C.S.) (see Figure 10).

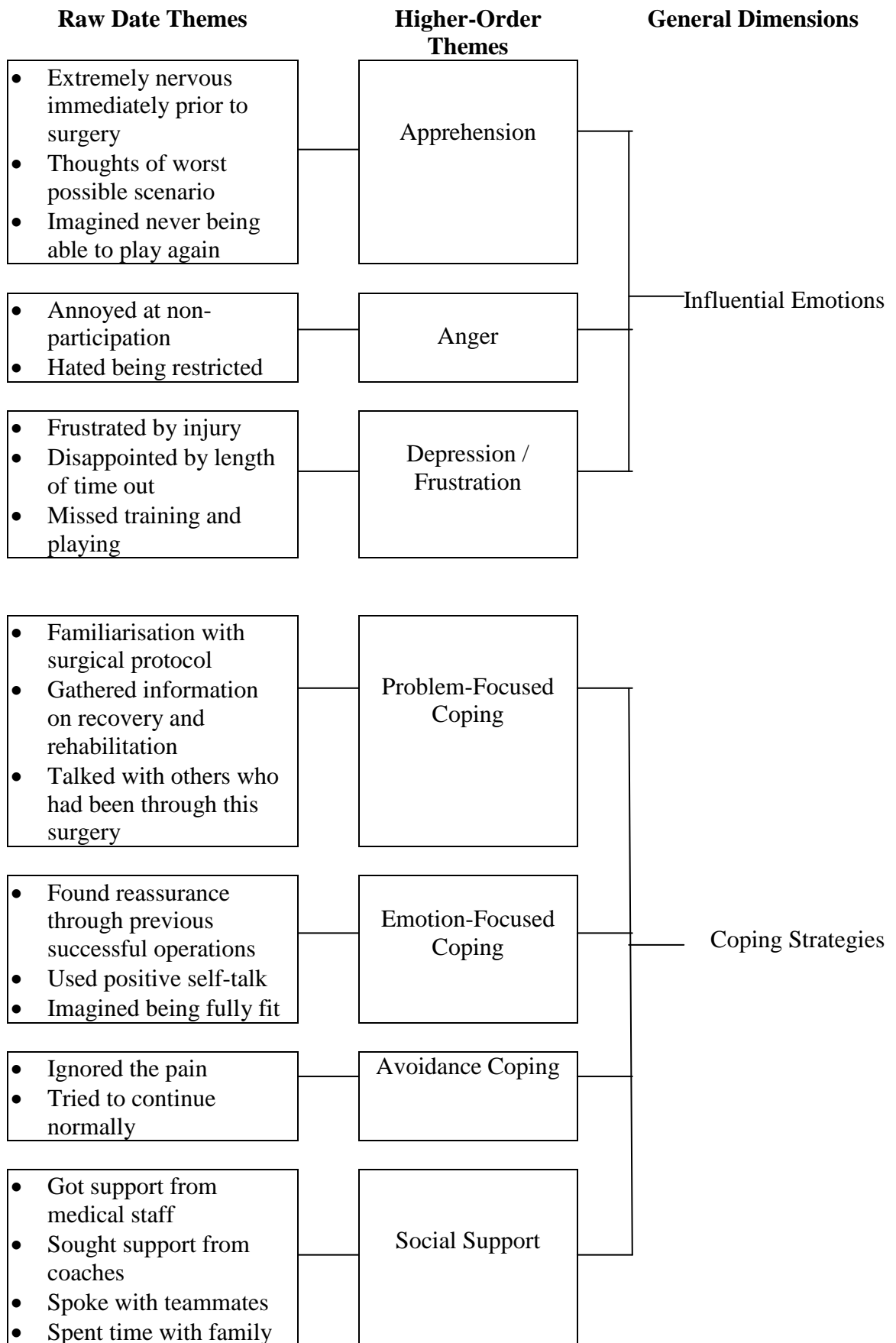


Figure 10 – Pre-Surgery Phase

Post-surgery phase identified four higher-order themes; *Relief, Anxiousness* (In. Em.) and *Problem-Focused Coping, Avoidance Coping* (C.S.) (see Figure 11).

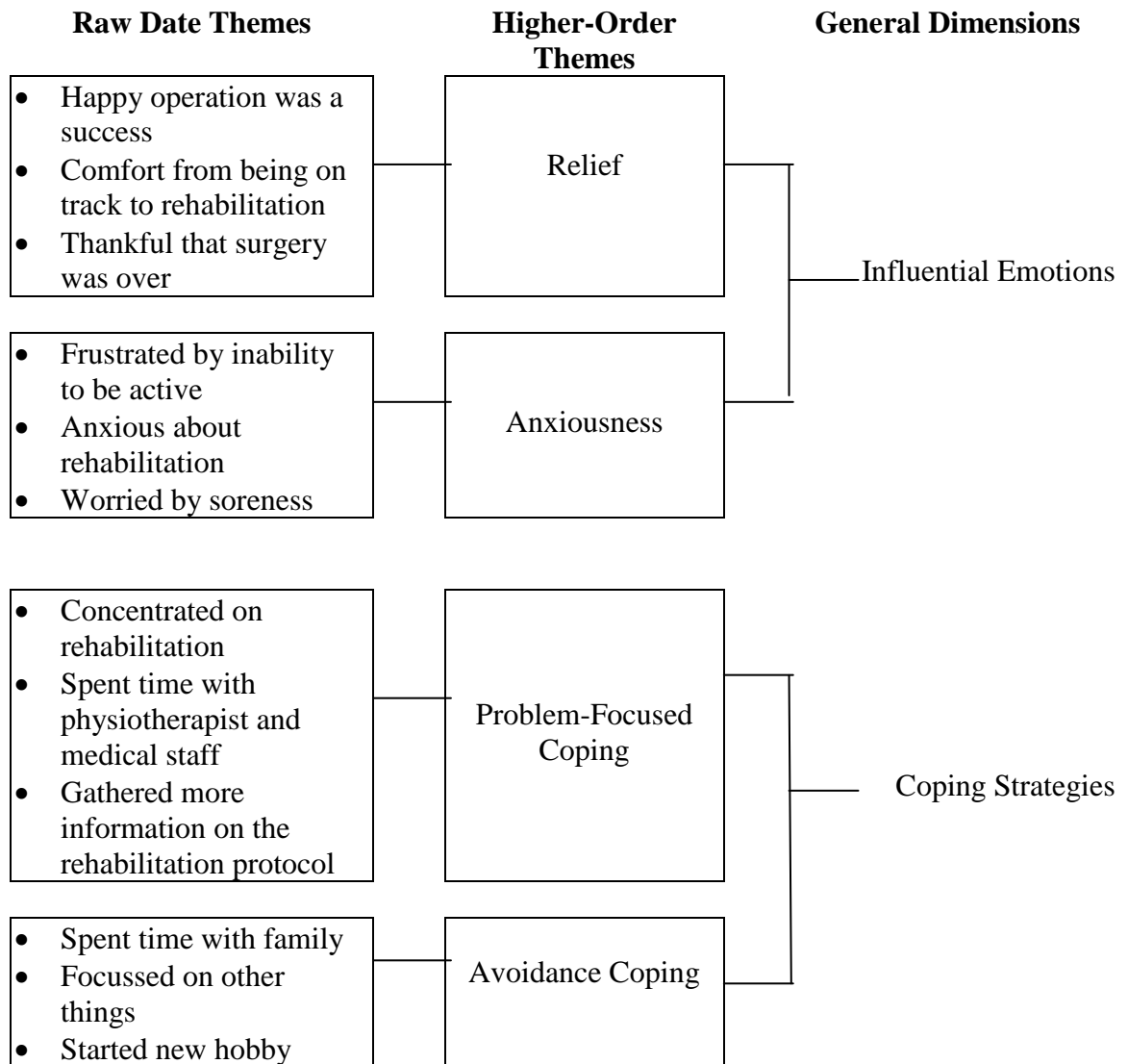


Figure 11 - Post-Surgery Phase

Early limited participation phase recognized five higher-order themes; *Encouragement, Apprehension* (In. Em.) and *Goal Setting, Avoidance Coping, Influence of Previous Injury Knowledge* (C.S.) (see Figure 12). Late limited participation phase coalesced seven higher-order themes; *Encouragement, Apprehension, Depression / Frustration* (In. Em.) and *Benefits of Goal Setting, Social Support, Problem-Focused Coping, Avoidance Coping* (C.S.) (see Figure 13). Return to play phase composed of six

higher-order themes; *Confidence Building, Apprehension, Relief* (In. Em.) and *Goal Setting, Problem-Focused Coping, Social Support* (C.S.) (see Figure 14).

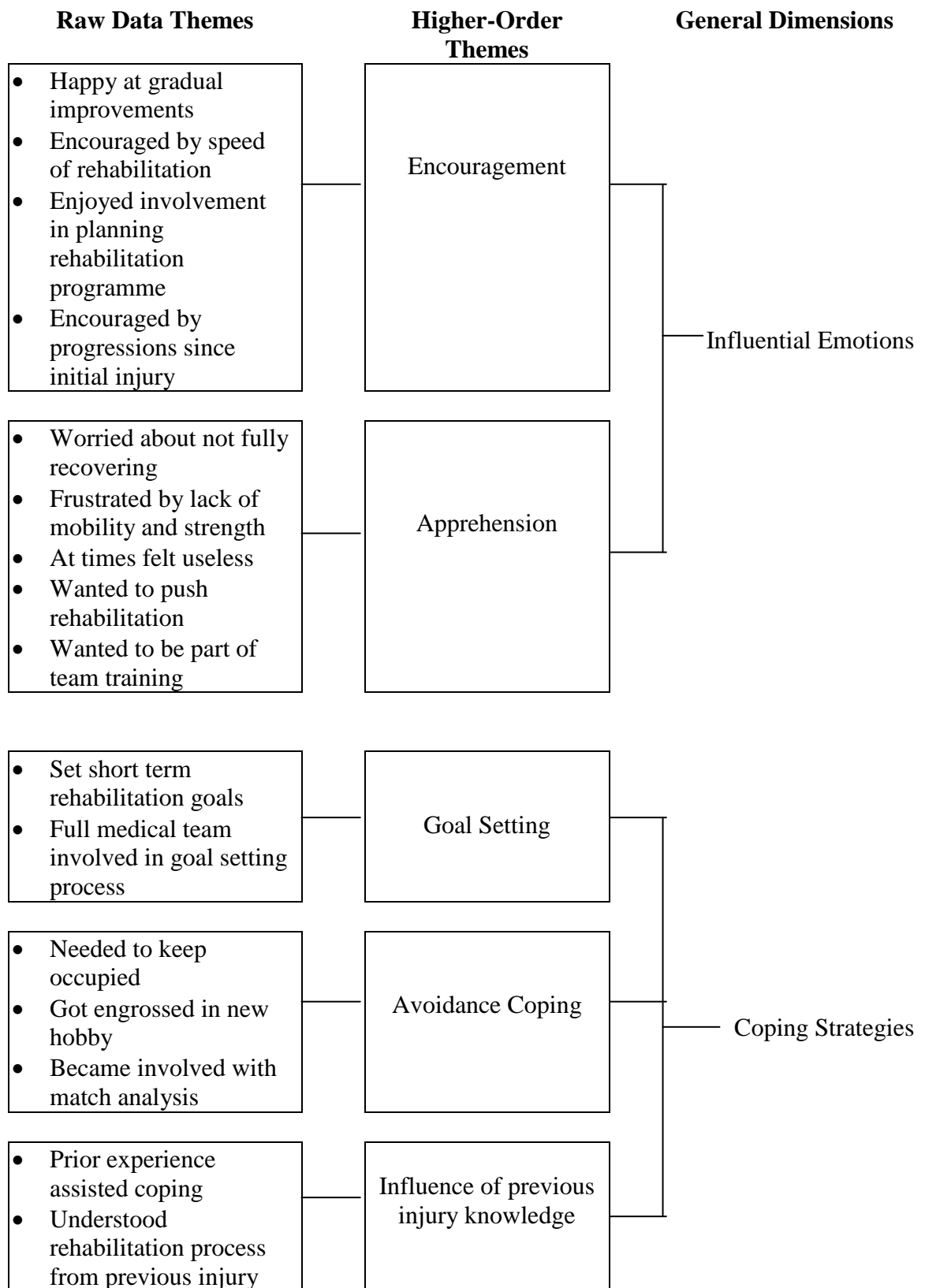


Figure 12 - Early Limited Participation Phase



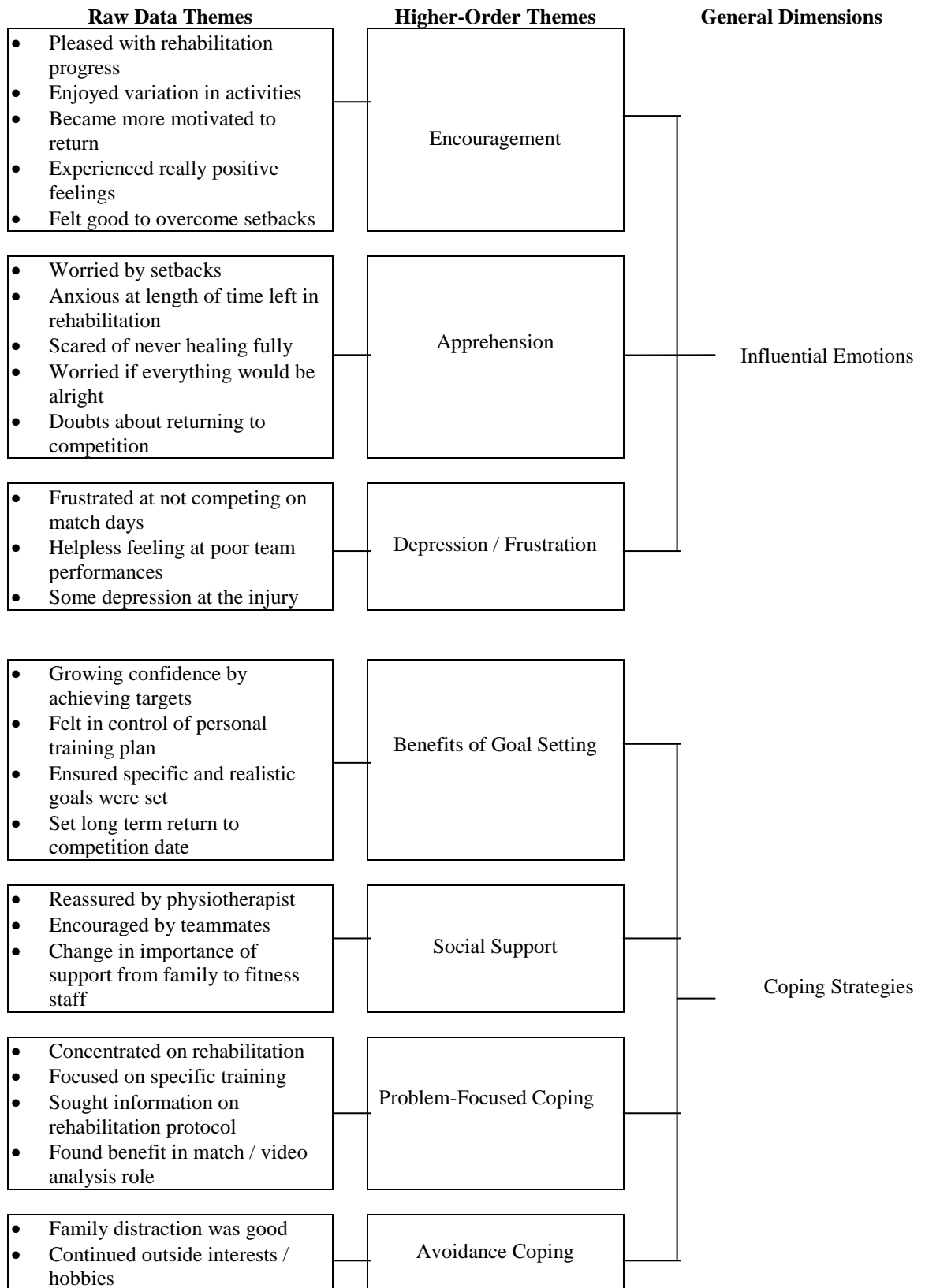


Figure 13 – Late Limited Participation Phase

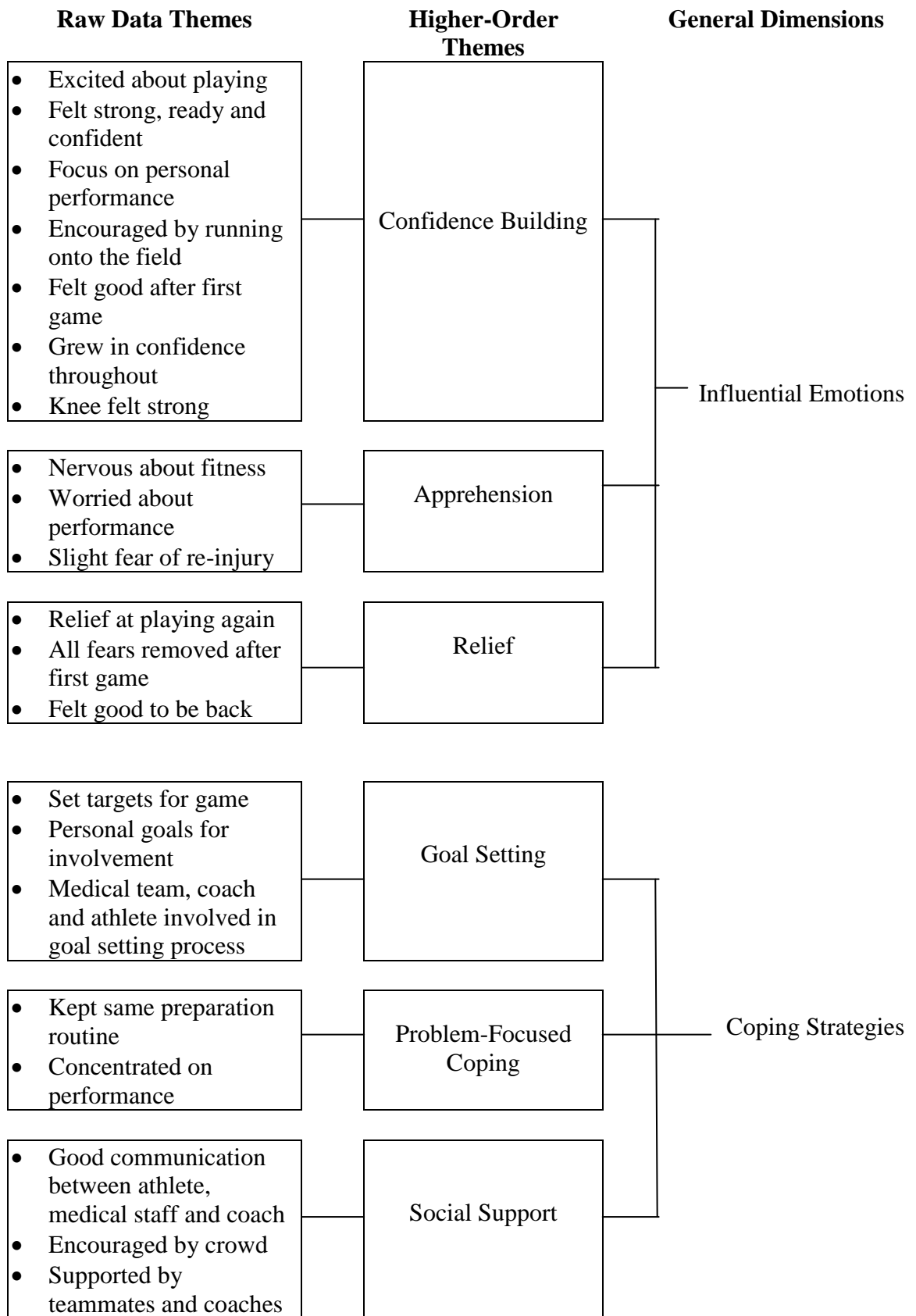


Figure 14 – Return to Play Phase

The results of the present study will be presented according to the six phases identified:

### *Initial Injury Phase*

Like many other athletes Tom's initial response to his injury was one of shock and disbelief (Evans & Hardy, 1999; Grove & Gordon, 1995; Johnston & Carroll, 1998), especially due to the delay in the diagnosis and the resulting lay off from sport. "I thought it was just another of those bumps and bruises that you get when you play, simple knocks that occur that you shake off with a bit of icing. To find out I was out for the season was a massive blow, I couldn't believe it". On the ERAIQ Tom states, "I was very shocked at the length of time I would be out for and completely gutted at the amount of rugby I was going to miss".

In accordance with previous findings in the injury rehabilitation literature, following the diagnosis and initial shock, Tom experienced a wide range of mainly negative emotions (McDonald & Hardy, 1990; Tracey, 2003). Anger at the soreness in his knee and the length of time he was expected to be in rehabilitation was evident, as well as a sense of helplessness and feelings of uselessness. These emotions were compounded by the loss of independence that he experienced and requiring others to do simple tasks for him, "I felt really bad because a lot of those simple things you do everyday without thinking about, I needed help with, I just wanted to carry on with a normal lifestyle". This observation was confirmed by relatively high scores for helplessness (12) and frustration (10) on the ERAIQ.

Tom reported some frustration and depression as a result of his injury during his interviews and in his diary. "I initially thought about my career, worried it was over. Then I was gutted at missing playing time and knowing how much time I'd miss. I had a goal to be an international player this season, that's gone now. I just want to play". These emotions are commonly experienced by athletes responding to injury (Brewer,

2001) and are generally the most intense immediately following injury but decrease over time being replaced by more positive emotions (Quackenbush & Crossman, 1994). Grove and Gordon (1995) emphasize the benefit of early acceptance of injury by an athlete, highlighting that the injured athlete will then focus on the recovery and become actively involved in the rehabilitation programme. Tom insinuates that he had no time to dwell on the injury and acceptance had to occur immediately, as little time was available between diagnosis of the injury severity and the surgical intervention. This acceptance did encourage him to seek further information regarding the surgery and the rehabilitation process, something he later attributed his successful rehabilitation to. Previous research demonstrates the benefit of this to injury rehabilitation (Bianco et al., 1999; Brewer et al., 1995).

#### *Pre-Surgery Phase*

Both emotion-focused (self-talk, reassurance) and problem-focused (information gathering on medical procedures and rehabilitation programmes) coping strategies were employed by Tom during this stage. In particular the use of problem-focused coping provides the athlete with control over their rehabilitation and return to competitive sport; this is best achieved by seeking medical advice, adhering to the rehabilitation protocol and setting goals for rehabilitation (Kerr & Millar, 2001). Tom also used avoidance coping in order to deal with the pain.

Tom's prior experience of undergoing surgery benefited him by reducing some of the negative aspects and apprehension. "I was nervous a couple of minutes before surgery, thinking what happens if it all goes wrong, what if I can't play again? But I knew this was the only way that I would ever play again, so I just tried to relax". Social support is a vehicle for enhancing the athlete's well-being (Richman, Hardy, Rosenfeld, & Callan, 1989) and those with high level social support appear to fare better when rehabilitating from health related problems (Cohen & Willis, 1985; Udry,

2001; Wiese, Weiss, & Yukelson, 1991). Tom's social support was provided by a network of people (Richman et al., 1989). He used his parents to help regain his emotional control and benefited from their willingness to listen and comfort him during difficult periods. Teammates became a source of inspiration to return to full fitness and the medical staff aided his understanding of the injury and the rehabilitation process. "Having all those people to support me was great. It allowed me to get the support from all areas and not just be limited to one person's advice. I know what some people are like and they would tell me that I would be back playing in 4-6 weeks, which is not what I would have needed. Everyone involved allowed me to keep a realistic view on what I was going to go through". Tom received social support at the pre-surgery time when it is most needed and often least available (Heil, 1993) and it provided him with feelings of being needed and a sense of security (Wiese et al., 1991). In addition, Tom was aware of the notion that unskilled others can provide unhelpful support by trying, among other things, to minimize the importance of an event, avoid open communication about the event, criticize attempts at coping, encourage quicker coping, and give inappropriate advice (Lehman et al., 1986).

#### *Post Surgery Phase*

Tom's initial response to the successful surgery was of relief: "I was happy that everything had gone well and comforted to know that I was back on track" and anxiousness: "There was some tenderness and soreness in my knee for a good time after the surgery, which really worried me, but my main concern was relating to beginning the rehabilitation". ERAIQ and SIP data supported this elevation of negative emotions immediately following surgery (LaMott, 1994; Morrey, 1997).

Both problem-focused and avoidance coping strategies became effective methods for Tom to cope following surgery. In particular problem focused coping strategies have been found to assist adherence to exercises (Udry, 1997). Although

generally determined to be maladaptive, Tom also used avoidance coping strategies (learning a foreign language, spending time with family and friends) to prevent uncontrollable negative situations escalating. “It was nice to be able to get away, have a break, do something different, as I was always concentrating on the injury and trying to get myself fit. By taking up a new hobby I felt that I was developing myself and it had nothing to do with playing or having to compete”. Both the avoidance coping strategies and the problem-focused strategies utilized by Tom were underpinned by social support. Green and Weinberg (2001) identified that there is a lack of research contrasting the effect of social support and coping skills during injury rehabilitation. They continue to suggest that an inverse relationship exist between these and mood disturbance following injury. The current research suggests that social support plays a factor in mood disturbance.

Tom had a strong desire and focus towards rehabilitation and return to competition, which enabled him to reduce the significance of any pain suffered. “At times I felt a bit sore but this was no worse than the pain you get from the regular bumps and knocks you take when playing. I just tried to forget about the pain and concentrate on what I had to do”. This was supported by the SIP data. Tolerant of pain not only results in greater adherence (Byerly, Worrell, Gahimer, & Domholdt, 1994; Fields et al., 1995) but also appears to be moderated by mental toughness (Levy et al., 2006). However, the latter requires further research evidence.

#### *Early Limited Participation Phase*

Encouragement, particularly by seeing the progressions that he was making, was important at this stage of rehabilitation. “I felt good about being able to do some activity again. I could slowly see the improvements; see the range of movement increasing. It was good, made me feel like I was getting somewhere. I was a little closer to returning”. Unlike previous research (Bianco et al., 1999; Gould et al., 1997a; Shelley, 1999) a fear

of re-injury was not a major cause of concern at this stage, rather there was a fear of failure to recover (Tracey, 2003). “At times it is difficult to see me ever playing again or getting back to that level of performance. It is just such a long rehabilitation process”. The early limited participation phase is the first where prior injury experience played an influential role. “I knew I couldn’t rush back. I knew the dangers. From before I knew that if I pushed myself too hard then I would injure myself further and be out for even longer”. The effects of prior injury experience on rehabilitation have had minimal or no research conducted; this despite the fact that habit has become a predictor of adherence to health behaviours and exercise participation (Levy, Polman, Clough, & McNaughton, 2006). It could be suggested that there are both positive and negative aspects associated with similar rehabilitation experience. Tom’s comments suggest that he used his prior experience as a coping strategy and it was of great benefit to him. However, it is possible that having this experience could inhibit him from completing a speedier return to competition or enforce a reluctance to adapt his rehabilitation. This is an issue that warrants further investigation.

The current study supports the importance of goal-setting in injury rehabilitation (Evans & Hardy, 2002; Russell, 2000; Theodorakis, Malliou, Papaioannou, Beneca, & Filactakidou, 1996). Goal setting (problem-focused) was a principle coping strategy utilized by Tom during his rehabilitation. “Having something to focus on is really beneficial. It’s not just about the long-term return but setting targets that I know I can reach. I don’t have to think of the big picture just some smaller task”. An issue, however, is the fixed rehabilitation protocols for ACL injuries allowing little input, autonomy and control on the part of the athlete. Tom found the strictness of the rehabilitation protocol and established goals frustrating. “I had a target to reach each session and it didn’t matter whether I could do more or less than that. When I felt good I

wasn't supposed to push myself further, which annoyed me. I knew I could do more, wanted to, but the medical staff said no".

Although the benefits of problem and emotion focused coping have been reported (Kerr & Miller, 2001) Tom utilized a number of avoidance coping strategies during this stage to allow himself to become removed from the injury and avoid constant concentration on his physical state. "I just needed to keep busy and avoid dwelling on the situation". He became engrossed in his new hobby and assisted with other roles in the club, including match analysis, marketing and community development. These tasks were particularly important on match days, when Tom, like many professional athletes, found it difficult to watch his teammates perform. Involvement with the match analysis also allowed him to develop his playing skills and develop his 'game sense'. Similar results have been identified with athletes using perceptual-cognitive training to improve performance (Faubert & Sidebottom, 2012).

#### *Late Limited Participation Phase*

Tom experienced both positive and negative emotions during this stage. The most influential emotions were related to feelings of encouragement (increased motivation; enjoyment; positive experiences), which increased motivation and commitment to the programme. "Being able to see the progressions I'd made and that I was getting back closer to playing" and similar comments made by Tom in both the interviews and diary entries highlight this drive. The general encouragement he experienced during this phase allowed him to easily overcome the negative emotions, apprehension and depression / frustration that were occasionally felt. Tom's worries related to minor setbacks within the rehabilitation and doubts about never being able to return to full fitness (Bianco et al., 1999). A range of coping strategies were utilized to overcome negative thoughts and to maintain rehabilitation. This phase of rehabilitation highlight Folkman & Lazarus' (1985) notion of the dynamic nature of coping, involving



varied and multiple strategies. Goal setting, social support, problem-focused coping and avoidance coping were all utilized by Tom during this phase.

Tom experienced encouragement and growth in self-confidence and competence by achieving set goals. He was allowed more control of his rehabilitation protocol and could decide on specific activities within his training. This increased variety and encouraged the promotion of positive emotions. “I was able to do different things, try different exercises that should produce the same affect. It wasn’t just running in a straight line”. Sport injury rehabilitation literature is filled with research highlighting the benefits of variety on adherence and motivation (Niven, 2007; Taylor & Taylor, 1997). Similarly the increased autonomy emphasized by his medical team also appeared to improve adherence, supporting findings from health psychology literature (Ryan, Plant, & O’Malley, 1995; Williams et al., 1998). Although no specific measurement of adherence was identified, increases in commitment and dedication to the rehabilitation exercises were self-reported. Tom also identified a change in the importance of social support, moving away from the family and becoming more focused on the staff in charge of his rehabilitation. “The support from my family and friends was still useful, but it was the support from the physiotherapist and trainers that were crucial. They were the ones who would really help me get back on the field”.

#### *Return to Play Phase*

Of primary concern to Tom during this phase was confidence building and instilling the self-belief that he was physically ready to return to competition. “I took great confidence from the preseason training and the strength in my knee. I had concerns relating to my overall fitness but the medical staff reassured me that the preparation and testing my knee had gone through meant it was healthy”. This supports the notion that confidence training, focusing on the internal and controllable aspects of confidence, is beneficial to returning athletes (Wagman & Khelifa, 1996). Evans et al.

(2000) found self-efficacy to be very important during the final phase of injury rehabilitation and suggested that interventions at this phase should focus on regaining confidence. Podlog and Eklund (2006) identified similar concerns relating to doubts about performance; however in contradiction Tom experienced minimal fear of re-injury. The role of social support was of key importance to eradicating injury fears and increasing Tom's confidence. Magyar and Duda (2000) and Podlog and Eklund (2010) suggested that athletes receiving high levels of social support experience a greater quantity of self-confidence throughout rehabilitation. Medical staff were involved in a number of ways; reassuring him that his knee had fully rehabilitated, providing information in response to any of Tom's concerns; and in conjunction with the coaching staff setting goals for him to achieve. The coaching staff also avoided any discussions connected to the injury and kept a highly positive atmosphere. Tom's teammates provided useful support and encouragement for him, allowing him to feel integrated as part of the team again. Tom's first competitive game following his rehabilitation was a 'home game' and the encouragement of the supporters featured prominently within his recollections. "It was awesome having the first game at home. The crowd noise was brilliant and I got such a cheer when my name was called, it really pumped me up, really focused me". Tom's average score of 4.6 for the emotional / information support section of the MOS-SSS indicate the high levels of support he received to aid his return to competition.

The development of a pre-performance routine was also beneficial (Jackson & Baker, 2001). "Following the same routine really helped. It made me concentrate on my performance and my role within the team, preventing me from concentrating on my knee". Activities that promote a familiarization and encourage positive emotions related to prior performance appear to benefit the returning athlete. However, more research on this is required.

Intense training allowed Tom to realize his knee was physically strong enough for competition. This training developed his perceptions of competence (Podlog, 2006) and increased familiarity with required performance standards (Bianco, 2001; Podlog & Eklund, 2006). A general sense of relief was identified following return to competition and increased competence was gained with each performance. “Knowing that I could compete at the top level again was a real thrill. I felt better, stronger, and knew that I was back where I wanted to be. My knee stood up really well and I knew that everything was going to be good”.

### *General Discussion*

The importance of autonomous regulation in relation to adherence has been discussed for many years within health psychology (Williams et al., 1998) and the application of this information to sports injury rehabilitation is prevalent to the current study. It can be suggested that a perceived autonomy leads to greater motivation and adherence to an injury rehabilitation programme and therefore to improved and possibly speedier return to competition. Research has acknowledged that significant others i.e. health care providers, family, educators providing an autonomy supportive environment could greatly influence the motivation and adherence of an individual (Malek, 2006; Williams et al., 1998). Both Perceived Autonomy-Supportive Climates questionnaires emphasize the sizeable amount of autonomy Tom was granted during his rehabilitation. Although structured within the constraints of the rehabilitation protocol, Tom stated he strongly agreed that his physiotherapist and coach, however not quite to that same extent, provided an autonomy-supporting climate. This is consistent with recent research highlighting the importance of physiotherapists in providing an autonomous supporting climate within sport injury rehabilitation (Levy et al., 2008; Niven, 2007).

Much research has identified the use and advantage of goal setting within a rehabilitation context (Evans & Hardy, 2002; Theodorakis et al., 1997). It is also stated

that goal setting can increase the autonomy of an activity in rehabilitation (Levack, Dean, Siegert, & McPherson, 2006). However, some caution may need to be taken when integrating a goal setting programme with injury rehabilitation and further research needs to be undertaken to investigate these issues. The specificity of an ACL rehabilitation protocol dictates the quantity of work the rehabilitating athlete can perform, therefore a number of set goals are already established without any input from the athlete. This could influence the amount of autonomy experienced by the rehabilitating athlete and hence affect the psychological rehabilitation and adherence. Similarly other benefits of goal setting may be diminished.

The idiosyncratic nature of case study research needs to be noted. Gallagher and Gardner (2007) suggest that individual differences may have an influential impact on an athlete's response to injury. There is a possibility that the emotions experienced and coping strategies utilized by Tom are unique to his rehabilitation and occurred as a result of his personality. As such further research with a larger sample size is needed to identify the generality of these responses. Likewise the effectiveness of the coping strategies employed has not been assessed within this study and further investigation is required for both approach and avoidance strategies. Further quantitative research is needed to fully understand the issues involved with athlete response to injury and those factors most likely to lead to positive outcomes. With this in mind, and based on the evidence from this case study, two specific questions are suggested for further analysis: (1) Are both approach and avoidance coping strategies facilitative to rehabilitating athletes?; (2) What is the role of autonomy within injury rehabilitation?

### Conclusion

Problem-focused and avoidance coping strategies were most commonly used and both were of high importance. Problem-focused coping allowed for increased

autonomy and adherence, while avoidance coping was suggested to be essential to reduce the depression and frustration of being injured.

Research within the psychology of injury rehabilitation has moved away from stage models (Kübler-Ross, 1969; Pedersen, 1986) to utilize a cognitive appraisal approach (Brewer, 1994; Wiese-Bjornstal et al., 1998). However by identifying the most influential emotions throughout each phase of the rehabilitation a linear process can be established (Shock → Depression → Relief → Encouragement → Confidence Building). Although much further research is required this model could be useful for those working with professional athletes rehabilitating from severe injury. It is suggested that the occurrence of a setback within the rehabilitation will return the athlete to the beginning of the model, however the time spent in each previous stage will be reduced. The influence of coping strategies utilized does appear to assist with the transition between each stage of this proposed model, and as such provides some support for the combination of cognitive appraisal and grief models (Striegel et al., 1996).

## CHAPTER 9 – EPILOGUE

### *9.1 Summary of the Findings*

The overall aim of the present thesis was to investigate the psychological factors associated with ACL injury rehabilitation and return to play experienced by professional rugby union players. Study 1 focused on the psychological effects of surgical intervention. The aim of this study was to identify the emotions and coping behaviours of the professional players' pre and post surgery. Shock, depression and anxiety were experienced prior to surgery, with more positive emotions being portrayed following a successful operation. The use of instrumental coping and social support facilitated the development of positive emotions and encouraged concentration on the rehabilitation process. Prior injury experience appeared to impact the use of adaptive coping strategies, with those suffering severe injuries previously in their sporting career more likely to engage in such activities.

Study 2 aimed to gain a greater understanding of the emotions and coping strategies utilized when returning to competition following ACL reconstruction. The findings suggest that gaining confidence in the injured body part is central to successful return. This confidence is established by ensuring complete rehabilitation is undertaken, and making certain the player is able to demonstrate strength and functioning in the injured knee. The greatest fears for players returning to competition were related to the physical fitness and performance, rather than re-injury. A specific goal setting programme could benefit each player's return, by encouraging them to concentrate on sport / position specific activities and avoid concentration on the injury. Performance accomplishments also appear to benefit return, with each player growing in confidence from achieving objectives and increasing game time.

Study 3 investigated the facilitative nature of avoidance coping during the rehabilitation. Research has suggested avoidance coping might be beneficial to rehabilitation in the short term but detrimental in the long term. This study aimed to identify if avoidance coping could have both short term and long term benefits during rehabilitation. It was postulated that avoidance coping (as well as emotion focused coping strategies) could help in reducing emotional reactions. Hence, high emotions make it difficult to make rational decisions. As such it would be better to first invoke a coping strategy which lowers emotions before using a problem focused strategy. The findings of this thesis identified both cognitive and behavioural avoidance strategies are employed to equal extents by the rugby players. In addition the results suggest that avoidance coping can be facilitative to professional athletes rehabilitating from serious injury. Hence, the use of avoidance coping strategies appeared not to influence the long-term rehabilitation. For example, player 1 in the present thesis avoided concentration on the injury by undertaking personal development (i.e., learning a new language). This reduced the frustration experienced by incapacity and aided concentration on rehabilitation later in the programme. Results propose that commitment to a new goal (i.e., post sporting career development) during rehabilitation can be an adaptive coping strategy, and reduce the impact of negative emotions following injury and during the rehabilitation, corroborating previous research in general health psychology (Wrosch et al., 2003a). Further, this thesis' findings suggest the treatment team should encourage players to become engaged with alternate work within the organization as this could reduce feelings of isolation and loneliness during the rehabilitation.

The aim of study 4 was to discover how the three needs identified by SDT (autonomy; competence; relatedness) were experienced by the injured professional rugby union players and to ascertain how these constructs assisted their rehabilitation and subsequent return to play. The prediction that high levels of the three needs of SDT

can assist rehabilitation by encouraging the injured player to take ownership of their rehabilitation was supported. By obtaining an in-depth understanding of the injury and rehabilitation process increases self-regulation and provide a sense of control for the injured player. Having an input into the rehabilitation programme assisted these players during rehabilitation, particularly as it reduced frustration of repetition of exercises, however caution needs to be taken as strict ACL rehabilitation protocols could reduce the amount of perceived autonomy experienced by each player. Increasing physical and performance proficiency developed competence and motivated these players to continue during difficult periods of the rehabilitation. Further, keeping each player involved within the team setting increases relatedness and reduces feeling of isolation and loneliness.

Study 5 provided a comprehensive case study of one player, who had provided the most detailed account of his injury experience. The aim was to examine the emotions and coping responses throughout the six phases of rehabilitation. The data he provided suggests that PFC and avoidant coping strategies were the most utilized throughout the rehabilitation. PFC allowed for increased autonomy and adherence, while he used avoidance coping to reduce the depression and frustration of being injured. Identifying the most influential emotions throughout each phase of the rehabilitation a linear process could be established (Shock → Depression → Relief → Encouragement → Confidence Building).

Taken together this programme of work showed that professional rugby union players who suffered an ACL injury that required surgical intervention experienced a range of positive and negative emotions throughout their rehabilitation. Initial responses relate primarily to negative implications associated with the injury (i.e., frustration; anxiety; depression). However, following successful surgery these are replaced by



positive emotions and cognitions (i.e., anticipation; optimism). Early acceptance of the severity of the injury was facilitated by the use of instrumental coping strategies and providing each player with more information about the injury and rehabilitation process was stated by the injured players to be particularly beneficial. During the limited participation phases positive emotions were developed by performance accomplishments and those working with rehabilitating athletes are encouraged to emphasize both physical and performance developments. Allowing the player an input into the rehabilitation programme can encourage greater adherence and acceptance of the set goals, while removing issues of boredom caused by repetition of exercises. Players did note that the strict nature of some ACL rehabilitation protocols increased frustration during the rehabilitation, however when explanations were provided by the treatment team each player was able to accept the activity and apply himself fully to the rehabilitation. During the return to competition phase concerns were mostly associated with reductions in physical fitness, with only minimal concern of re-injury. Players stated that having an environment that did not focus on the injured knee and concentrated on performance was beneficial to their return. Coaches providing a specific goal setting programme appear to support successful return to competition, as these goals can reduce the chances of the player being inhibited by the injury.

A number of unique findings were identified in this thesis which will add to our understanding of psychological factors associated with rehabilitation from ACL injuries and possibly injury in general. The long term benefits associated with avoidance coping have not been previously discussed within the literature. Identifying that players can use this to reduce the impact of negative emotions, without impacting their long term rehabilitation, is advantageous to those working with rehabilitating players. Treatment teams could encourage players to undertake alternate work or career development activities while injured, as such actions could allow the player to avoid constantly

thinking about the injury and incapacity. This thesis develops the notion of the benefits of self-determination within injury rehabilitation. Although a much greater analysis of specific behavioural data is required examination of the results appear to suggest that players who take full responsibility for their own rehabilitation are more engaged and persistent during the process. Highly self-determined players appear to have greater levels of self-confidence in their ability to return to competition and perform at prior performance levels. The use of specific goal setting programmes to aid return to competition have not been previously identified in the psychology of injury literature. Players discussed the benefit of having specific targets to achieve during their first three games back in competition. Benefits were gained by the player knowing how long their participation would be (i.e., 20 minutes during the first game), however greater increases were seen when very specific goals were developed in conjunction with the coach and physiotherapist (i.e., completing 5 tackles in the first twenty minutes). These goals encouraged the player to become involved and reduced the chances of them avoiding situations.

### *9.2 Strengths of the research*

The use of a specific homogenous group of professional rugby union players can be considered a strength of the present thesis. Andersen (2001) highlighted that many professional athletes are extremely dedicated to training and competition, which could mean that the psychological factors they experience are significantly different to recreational athletes. Little research to date has been conducted with professional athletes and as such this thesis provides a unique contribution to the existing literature and increases our understanding on the psychological factors associated with injury rehabilitation in professional athletes. With professional sport still growing rapidly in popularity, and with performance critical to the success to the sporting organization,

providing more research for those working within professional or elite level athletes is essential. This thesis provides a number of practical implications that could be implemented by sports injury treatment teams to facilitate an athlete's successful return to competition following serious injury (see below for further details).

The longitudinal design utilized within this thesis could also be judged a strength. Firstly, by collecting data concurrent with each player's rehabilitation reduces the chances of casual contributions being made and information lost through incomplete or biased/false recall. The emotions and coping strategies identified were currently being experienced by the professional players, removing the chance that such factors (i.e., anxiety) could be over-looked at a later time. Secondly, to date longitudinal approaches have been only minimally employed when investigating the psychology of injury rehabilitation. Many studies have had large time delays between the athletes' rehabilitation from injury and the actual data collection. The collection of regular data during rehabilitation provided a unique opportunity to map changes over time.

The qualitative dominant approach is also beneficial for investigating the psychological factors associated with injury rehabilitation. As investigators have typically asked athletes to respond to already developed instruments, there has been relatively little opportunity to identify previously unknown or unhypothesized factors (Gould, Tammen, Murphy & May, 1988). Thoits (1995) called for more qualitative research because such methods are better to detect the complexity involved in health psychology in general and the psychology of athletic injury in particular. Similarly, the use of open-ended semi-structured interviews and self-report diaries allow participants to identify a broad range of injury stressors and factors to enhance or hinder the injury rehabilitation process, without being constrained by the investigators preconceived notions (i.e., the participants perspectives were provided). Combining qualitative and quantitative methods at various points during the rehabilitation, this thesis was able to

increase the validity and reliability of the findings. Triangulation of different data sources increases the trustworthiness of the research and allows for coherent justification of the themes identified (Cresswell, 2003). For example scores for the question “find out more information about the injury” on the CHIP inventory was identified to support the information obtained during the interviews.

### *9.3 Limitations and recommendations for future research*

The low number of participants from a homogenous background in the present thesis limits the generalization of the findings, a characteristic common within qualitative dominant research. Logically, the first step would be to replicate the procedures with larger numbers of participants in order to validate and generalize the main findings. Individual dispositional differences in initial response to injury can impact the rehabilitation emotions and behaviors (Gallagher & Gardner, 2007), and as such more research is required with a greater number of athletes to ensure that the emotions experienced and the coping strategies invoked by these players are not unique to them. The use of only professional rugby union players also limits the generalization of the findings. These professional athletes receive a substantial amount of monetary provision for their performance and have a greater medical support network at their disposal. As such, their experiences may be very different to performers from different standards (semi-professional; good amateurs), not to mention recreational athletes. Future research needs to be conducted across a wider range of professional / elite level athletes, to enhance our understanding of the psychological aspects of injury rehabilitation within high performance sport, and how such experiences might differ as a consequence of skill level or medical provision.

Secondly it can be suggested that a lack of causality cannot be directly inferred due to the lack of specific behavioural, outcome or performance data. Although some

self-reported benefits are noted throughout the collected data, obtaining relevant statistics will allow for further assessment of specific components (i.e. adherence to the rehabilitation program) and as such highlighting the direct links to facilitative or debilitating actions. Utilizing a more specific mixed methodological approach to investigate each distinct phase of the rehabilitation and return to competition in greater detail is recommended for future research. The use of mixed methods research is advocated in the development of future research into the psychological aspects of injury rehabilitation, as the present thesis has demonstrated some distinct benefits of this process. However to improve the ability of the researcher to draw more specific conclusions, it is recommended that quantitative data can be collected on multiple occasions during the research project, which can increase the amount of behavioural, outcome and performance data encouraging further assessment of the self-reported experience and the observed behaviours. Similarly the increased amount of data can further assist triangulation and development of the qualitative data.

Although considered a strength of the research, longitudinal research designs can have some limitations. Inevitably new theory, research questions and data collection methods are developed during the period of investigation. Of particular interest to the present study is the design and publication of the ACL-Return to Sport after Injury (ACL-RSI) scale developed by Webster et al. (2008). The purpose of this scale was to measure the psychological impact of returning to sport after ACL reconstruction. Being able to use this scale could have enhanced the understanding of the psychological factors identified by the players returning to competition in this thesis. Likewise, the Social Support Inventory for Injured Athletes (SSIIA; Mitchell, Rees, Evans, & Hardy, 2005) was developed following the commencement of this thesis. The use of a sport specific measure of social support during injury rehabilitation could have assisted further with the confirmation or rejection of identified themes in this thesis. Similarly,

the amount and quality of research investigating the psychology of injury rehabilitation has increased in recent years. Although this information was utilized for comparing and contrasting the findings from this thesis, its availability may have altered some of the research methods utilized. Current research (i.e., Corbillion et al., 2008; Podlog & Eklund, 2006; 2007) could have been of assistance in the development of the interview scripts and self-report diaries used in the present thesis.

The frequent contact of the author with each of the players could also be considered a limitation. The author essentially became another source of social support, possibly allowing each player an outlet to discuss issues that he may not have felt comfortable doing with other sources. The author was also able to provide instrumental support to each player, and was asked on occasions to provide further information regarding rehabilitation protocols or activities that other players had utilized. Although this information is accessible elsewhere, it may have been more difficult for the player to obtain. Similarly, by the nature of the data collection methods, each player was able to reassess progressions within his rehabilitation, which could have increase competence in performance. The benefits of performance accomplishments within injury rehabilitation have been discussed previously within this thesis. As such, further research is required to determine the effect of an external (i.e., not part of the sports team or family) contact of support in facilitating the rehabilitation from ACL injury.

During each study reference has been made to the impact of prior injury on the current rehabilitation. Evidence suggests that athletes can use past experience to aid rehabilitation from ACL injury. However, some caution should be taken here as there may be physical differences with the current injury compared to previous injuries. Players may have developed habits from their previous injury experience that they either consciously or subconsciously try to incorporate into this rehabilitation. Further

research from both qualitative and quantitative perspectives is required to establish full impact of prior injury; however this study suggests effects can be seen in relation to acceptance of the injury, preparation and recovery from surgery, and adherence to the rehabilitation protocol. Future research should also consider the negative impacts that prior injury experience may have (i.e., if the player does not rehabilitate at the same speed as previously; different experiences due to alternate medical implications; the expectations a player may have).

Although the present thesis investigated the coping strategies utilized by each player, no specific measure of the effectiveness of each strategy was conducted. Coping effectiveness is difficult to measure. In addition, a coping strategy might work in the short term but might not be beneficial in the long-term (see Folkman & Moskowitz, 2004). Quantitative research could be utilized to establish the effectiveness of the strategies employed (e.g., Nicholls et al., 2006; Nicholls & Polman, 2007). Understanding the effectiveness of various coping strategies could allow the rehabilitation team to incorporate specific approaches to facilitate the rehabilitation and return to play.

Finally the use of a multidisciplinary team working with injured athletes needs further investigation. Within the present study no mention was made by the players as to the availability of a specific sports psychologist to aid rehabilitation. Further informal discussions with the players' physiotherapists identified that although they noted psychological aspects to be important to rehabilitation, they had no formal training within psychological aspects of injury rehabilitation. Research has recognized the need for more formal training of physiotherapists and cited the benefits of understanding the psychological process in rehabilitation of injured athletes (Hemmings & Povey, 2002). Arvinen-Barrow et al. (2007) further concluded that although physiotherapists have

significant practical experience, they would benefit from learning specific psychological techniques such as imagery or relaxation exercises. The availability of a range of professionals able to facilitate rehabilitation could be of great benefit to injured athletes. Within the present study two of the players were sent to see a medical expert in ACL injury and rehabilitation, and both noted the benefit of this. This also warrants further research to ascertain the impact of specialists on the psychological response of athletes to injury.

#### *9.4 Practical Implications*

Prior to surgical intervention feelings of depression and anxiety are predominant, and the results of the present thesis suggest that those working with ACL injured athletes should encourage the adoption of problem focused coping strategies. Specifically, medical personal could reduce the stress of athletes by providing them with a detailed overview of the surgical procedure and the subsequent rehabilitation programme. Knowledge of the process would increase perceptions of control in the injured athlete over both rehabilitation (Kerr & Miller, 2001) and the preparation for surgery (Ninedek & Kolt, 2000). Social support could also be influential when dealing with the emotions of injury and surgery. The physiotherapist is in a prime position to provide some of this support. As well as getting the injured athlete focused by detailing the surgical and rehabilitation procedures, the physiotherapist could provide assistance for the injured player in accepting the severity of the injury. Early acceptance of the injury appears to facilitate the rehabilitation by providing a greater focus on the rehabilitation goals, which can reduce the possibility of debilitating avoidant behaviours occurring (Grove & Gordon, 1995). Although time away from the sport may have some benefit to injured athletes' emotional control, engagement in debilitating behaviors may



impact the long term outcomes of the rehabilitation. The present thesis suggests that establishing new goals to compensate for the removal of sporting goals should be encouraged.

ACL injured players could also utilize teammates or other individuals as role models. This would help the athlete in understanding the complexities of ACL rehabilitation and knowledge of the importance of commitment to the rehabilitation. Other support (i.e., emotional; tangible) could be provided by a range of sources, including family, friends and coaches. Each can make a unique contribution to the emotional and behavioural responses of athletes undergoing surgery; especially as the normal support structures could be minimized at this time. On the whole, the athlete would probably benefit from a multidisciplinary team. Part of this team could be an appropriately trained (sport) psychologist who could assist in some of the strategies described above. Although the participants in this thesis were members of professional organisation there appeared to be no dedicated (sport) psychological support.

It has been suggested that during the physical rehabilitation athletes should be guided to become personally involved with the rehabilitation process (Niven, 2007). The physiotherapist could assist this by developing an autonomy supportive rehabilitation environment. Developing trust with all involved in the rehabilitation process promotes autonomy and provides the athlete with a sense of control. This trust can be enhanced by allowing the athlete to have some input into the rehabilitation activities. Research suggests that increased personal control during rehabilitation promotes more adaptive coping response (Heijmans, 1999) and increases persistence and adherence, which is corroborated by this thesis. Caution should be given to the impact of strict ACL rehabilitation protocols, which dictate specific time managed goals, as to the effect this has on the athlete's psychological responses. Where

individualized rehabilitation programs cannot be designed, medical staff should ensure the athlete understands the rationale of the restricted rehabilitation protocol.

Athlete confidence or competence beliefs could be developed by setting achievable short-term goals. Achieving the goals will result in athletes being able to monitor their progress in terms of physical abilities and at the same time have successful experiences thereby enhancing confidence and perceptions of competence. Evans and Hardy (2002) supported the use of goal setting in developing self-efficacy within injury rehabilitation settings. However, caution needs again to be made in respect of strict ACL rehabilitation protocols. The inability to achieve set targets may increase levels of frustration and may impact negatively on the rehabilitation process.

Due to the length of rehabilitation from ACL injury, athletes may experience a sense of loneliness and a loss of relatedness to teammates. Where possible, rehabilitation training teams could be created to develop comradery between members. Further, benefits have been identified by encouraging the injured athlete to undertake alternate work with the sports team (e.g., engaging in match analysis work). Such strategies could enhance feelings of relatedness, one of the three pillars of SDT. However, individual differences appear to exist in injured players wish to be involved in such activities.

Fear of re-injury has been commonly reported by athletes returning to competition following ACL injury, however more recently research and findings from the present thesis suggests greater fears relate to a lack of physical fitness and decreased performance levels (Podlog & Eklund, 2007). There are a number of ways to enhance an athlete's perceptions of their own fitness. For example, the successful completion of clinical (e.g., isokinetic-dynamotery) or sport specific (e.g., tackling ability) tests could provide the athlete with increased confidence in their physical and fitness status. Results

from previous research (Taylor & Taylor, 1997) and the present thesis also suggest that athletes should continue to use previously used performance routines, as such routines allow the athlete to improve confidence, focus and intensity to training and competition.

Coaches could have a significant impact on athlete's return to competition following injury (Bianco, 2001). Coaches could aid return by removing pressure on the athlete to return quicker than psychologically ready and by creating a highly positive performance environment (meaning concentration is on successful performance, rather than considered with the player's readiness to return). Athletes returning from ACL injury with more positive psychological responses (i.e., focus; confidence) generally experience a greater success returning to competition (Webster et al., 2008). Coaches could conduct conversations with player's to eradicate negative emotions and concerns (Podlog & Eklund, 2007). The three players in this study who had open conversations with their coach, reported more positive emotions about the expectations for their return; while the two players who did not have this communication with their coach experienced greater levels of isolation.

A specific goal-setting program aimed at encouraging engagement during return to competition can further benefit successful return. Coaches, medical staff, and possibly a trained (sport) psychologist and the returning athlete should all be involved in the design of specific, realistic goals aimed at returning the athlete to previous performance levels. The use of goals within the return to competition stage allows the athlete to concentrate on other factors and reduce concentration on the injured knee. Further, the achievement of these goals can increase perceptions of competence and self-confidence.

On the whole there are a number of actions which can be undertaken by either the athlete or significant others at each stage of the injury rehabilitation process which

will lower or eliminate negative psychological factors and enhance positive psychological factors. The execution of such strategies would be best implemented if the athlete is supported by a multi-disciplinary team which would include, as suggested previously, a qualified (sport) psychologist.

9.5 *Tabled summary of thesis findings*

Table 4 – Summary of thesis findings

<b>Stage of Injury Rehabilitation</b>	<b>Main Emotional Reactions</b>	<b>Adaptive Coping Strategies</b>	<b>Forms of Social Support</b>	<b>Possible Psychological Interventions</b>
Initial Injury	Shock; Depression	Information gathering	Family; Friends; Physiotherapist	Encouraging acceptance of injury severity
Pre-Surgery	Anxiety; Depression	Information gathering; Emotional control	Family; Friends; Medical staff	Relaxation
Post-Surgery	Relief; Optimism	Speaking with treatment team; Information gathering	Family; Friends; Medical staff	Goal setting
Early Limited Participation	Encouragement; Apprehension	Goal setting; Undertaking alternate work; Personal / career development	Family; Physiotherapist	Autonomy development
Late Limited Participation	Encouragement; Frustration	Goal setting; Personal / career development	Physiotherapist; Fitness conditioner; Rehabilitation training squad	Imagery; Positive self talk; Thought stopping
Return to Play	Confidence building	Goal setting	Coach; Physiotherapist; Teammates	Goal setting; Performance routines

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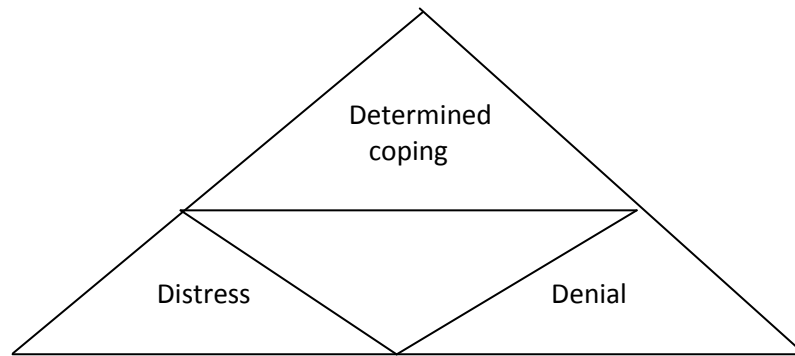
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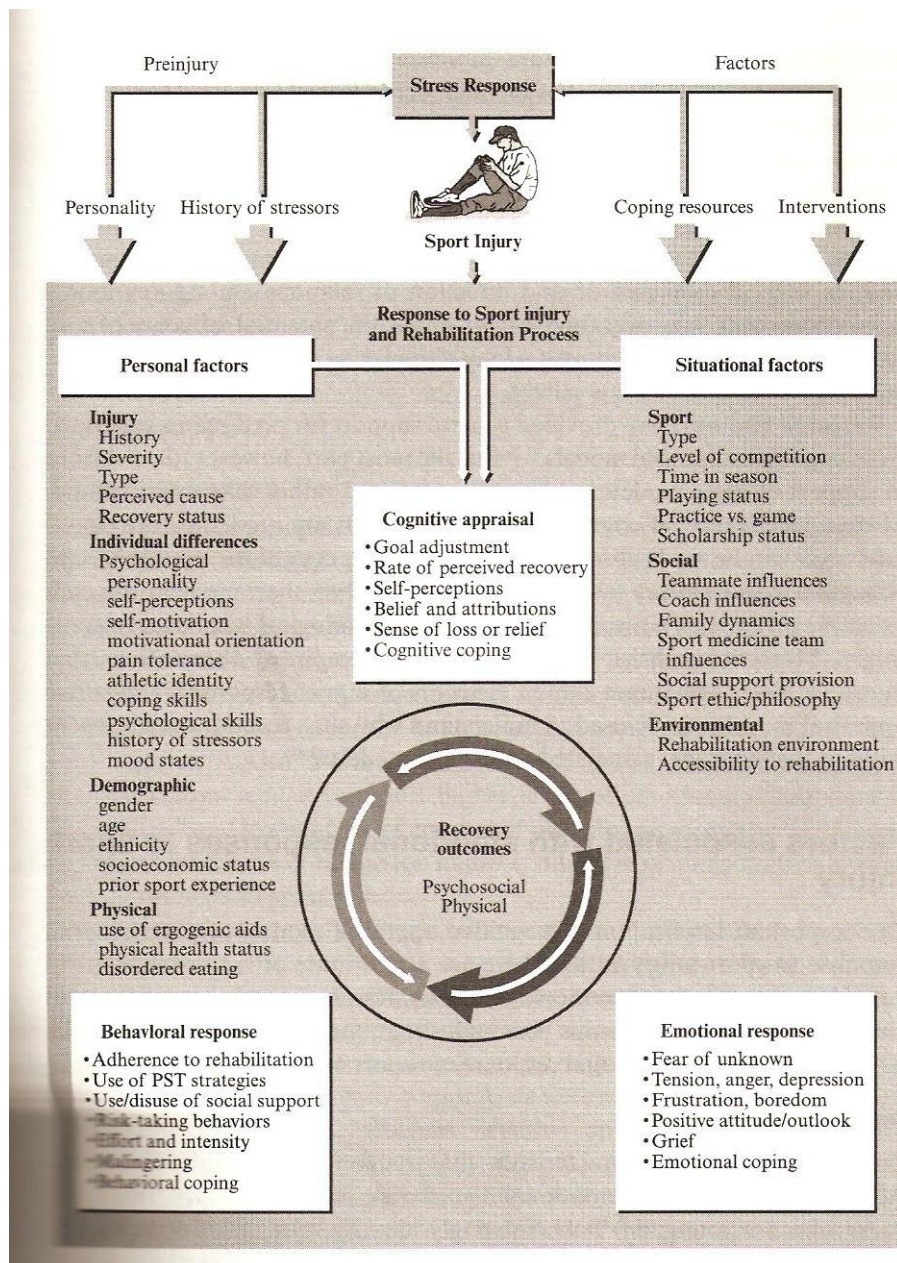


## APPENDIX 1



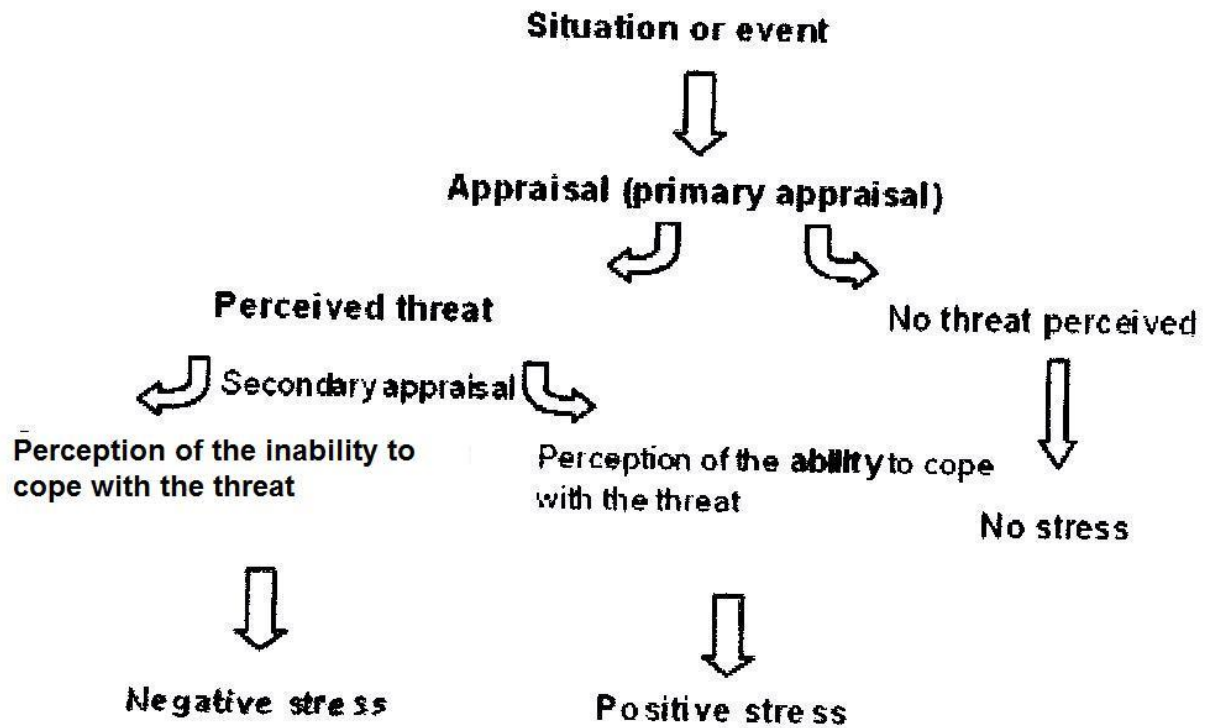
Affective Cycle of Injury. From Heil (1993) *Psychology of sport injury*. Champaign, IL: Human Kinetics.

## APPENDIX 2



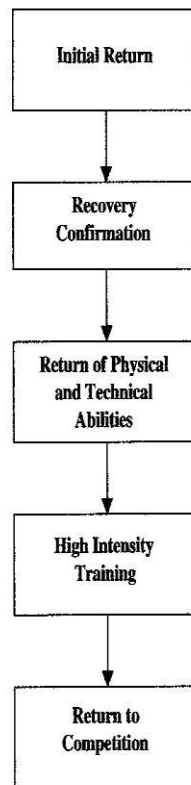
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## APPENDIX 3



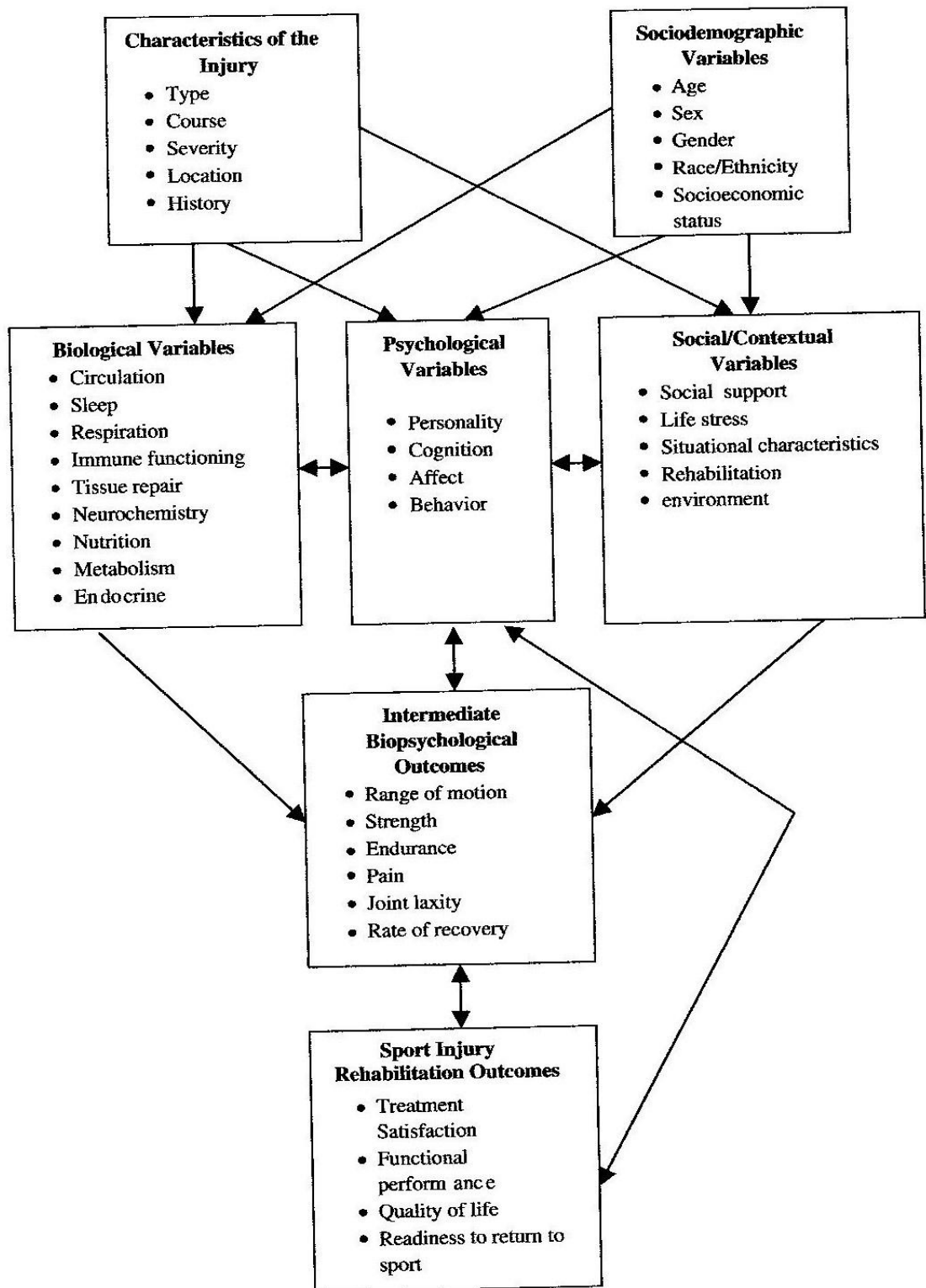
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## APPENDIX 4



Stages of return to sport. From Taylor & Taylor (1997). Psychological approaches to sports injury rehabilitation. Gaithersburg, MD: Aspen Publication.

## APPENDIX 5



A biopsychosocial model of athletic injury rehabilitation. From “Psychological aspects of sport injury rehabilitation: Toward a biopsychosocial approach” by B.W., Brewer, M.B. Andersen, J.L. Van Raalte, *Medical Aspects of Sport and Exercise*, edited by D. Mostofsky and L. Zaichkowsky, Morgantown, WV: Fitness Information Technology.





## APPENDIX 7

**SPORTS INVENTORY FOR PAIN**

Michael C. Meyers, PhD, FACSM, Anthony E. Bourgeois, PhD  
Arnold LeUnes, EdD

Below is a list of statements that describe the way an athlete often feels about discomfort and its influence on performance. Please read each statement, and fill in one circle to the right of each statement that best describes your feelings at this time. There are no right or wrong answers.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. I owe it to myself and those around me to perform even when my pain is bad.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. When injured, I feel that it's never going to get better.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. When in pain, I tell myself it doesn't hurt.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. I seldom or never have dizzy spells or headaches.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. When I am hurt, I just go on as if nothing happened.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. When hurt, I worry all the time about whether it will end.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
7. When injured, I tell myself to be tough and carry on.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Pain from my injuries is awful and I feel overwhelmed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. When hurt, I tell myself I can't let the pain stand in the way of what I want to do.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. I hardly ever notice my heart pounding and I am seldom short of breath.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. When injured, I just ignore the pain.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. I can't seem to keep pain out of my mind.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. I do not allow pain to interfere with my performance.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. I often worry about being injured.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. I very seldom have spells of the blues.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Sports Inventory for Pain (SIP). From Meyers, Bourgeois, LeUnes, & Middendorf. (2003). The Sports Inventory for Pain: Confirming factorial validity. *Medicine and Science in Sport and Exercise*, 35(5), S223.



## APPENDIX 8

	Not at All		Moderately		Very Much
Think about the good times I've had	1	2	3	4	5
Stay in bed	1	2	3	4	5
Find out more information about the injury	1	2	3	4	5
Wonder why it happened to me	1	2	3	4	5
Be with other people	1	2	3	4	5
Lie down when I feel tired	1	2	3	4	5
Seek medical treatment as soon as possible	1	2	3	4	5
Become angry because it happened to me	1	2	3	4	5
Daydream about pleasant things	1	2	3	4	5
Get plenty of sleep	1	2	3	4	5
Concentrate on the goal of getting better	1	2	3	4	5
Get frustrated	1	2	3	4	5
Enjoy the attention of friends and family	1	2	3	4	5
Try to use as little energy as possible	1	2	3	4	5
Learn more about how my body works	1	2	3	4	5
Feel anxious about the things I can't do	1	2	3	4	5
Make plans for the future	1	2	3	4	5
Make sure I am warmly dressed or covered	1	2	3	4	5
Do what my doctor tells me	1	2	3	4	5
Fantasize about all the things I could do if I was better	1	2	3	4	5
Listen to music	1	2	3	4	5
Make my surroundings as quiet as possible	1	2	3	4	5
Try to follow my doctor's advice	1	2	3	4	5
Wish that the injury had never happened	1	2	3	4	5
Invite people to visit	1	2	3	4	5
Be as quiet and still as I can	1	2	3	4	5
Be prompt about taking medication	1	2	3	4	5
Feel anxious about being weak and vulnerable	1	2	3	4	5
Surround myself with nice things	1	2	3	4	5
Make sure I am comfortable	1	2	3	4	5
Learn more about the most effective treatments available	1	2	3	4	5
Worry that my health might get worse	1	2	3	4	5

The Coping with Health, Injury and Problems (CHIP) inventory. From Endler & Parker, (2000). Coping with Health Injuries and Problems (CHIP). New York: MHS.

## APPENDIX 9

## MOS Social Support Survey

People sometimes look to others for companionship, assistance, or other types of support. How often is each of the following kinds of support available to you if you need it? Circle one number on each line.

	None of the time	A little of the time	Some of the time	Most of the time	All of the time
<b>Emotional/informational support</b>					
Someone you can count on to listen to you when you need to talk	1	2	3	4	5
Someone to give you information to help you understand a situation	1	2	3	4	5
Someone to give you good advice about a crisis	1	2	3	4	5
Someone to confide in or talk to about yourself or your problems	1	2	3	4	5
Some whose advice you really want	1	2	3	4	5
Someone to share your most private worries and fears with	1	2	3	4	5
Someone to turn to for suggestions about how to deal with a personal problem	1	2	3	4	5
Someone who understands your problems	1	2	3	4	5
<b>Tangible support</b>					
Someone to help you if you were confined to bed	1	2	3	4	5
Someone to take you to the doctor if you needed it	1	2	3	4	5
Someone to prepare your meals if you were unable to do it yourself	1	2	3	4	5
Someone to help with daily chores if you were sick	1	2	3	4	5
<b>Affectionate support</b>					
Someone who shows you love and affection	1	2	3	4	5
Someone to love you and make you feel wanted	1	2	3	4	5
Someone who hugs you	1	2	3	4	5
<b>Positive social interaction</b>					
Someone to have a good time with	1	2	3	4	5
Someone to get together with for relaxation	1	2	3	4	5
Someone to do something enjoyable with	1	2	3	4	5
<b>Additional item</b>					
Someone to do things with to help you get your mind off things	1	2	3	4	5

MOS-Social Support Survey (MOS-SSS). From Sherbourne & Stewart (1991). The MOS social support survey. *Social Science and Medicine*, 32(6), 705-714.

## APPENDIX 10

## Sport Climate Questionnaire

This questionnaire contains items that are related to your experience with your coach during your rehabilitation. Coaches have different styles in dealing with athletes, and we would like to know more about how you have felt about your encounters with your coach. Your responses are confidential. Please be honest and candid.

1. I feel that my coach has provided me choices and options.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
2. I feel understood by my coach.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
3. I am able to be open with my coach at our meetings.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
4. My coach conveys confidence in my ability to make changes.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
5. I feel that my coach accepts me.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
6. My coach has made sure I really understand about my condition and what I need to do.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
7. My coach encourages me to ask questions.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
8. I feel a lot of trust in my coach.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
9. My coach answers my questions fully and carefully.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
10. My coach listens to how I would like to do things.

- |  |          |   |   |         |   |   |          |
|--|----------|---|---|---------|---|---|----------|
|  | 1        | 2 | 3 | 4       | 5 | 6 | 7        |
|  | strongly |   |   | neutral |   |   | strongly |
|  | disagree |   |   |         |   |   | agree    |
11. My coach handles people's emotions very well.
- |  |          |   |   |         |   |   |          |
|--|----------|---|---|---------|---|---|----------|
|  | 1        | 2 | 3 | 4       | 5 | 6 | 7        |
|  | strongly |   |   | neutral |   |   | strongly |
|  | disagree |   |   |         |   |   | agree    |
12. I feel that my coach cares about me as a person.
- |  |          |   |   |         |   |   |          |
|--|----------|---|---|---------|---|---|----------|
|  | 1        | 2 | 3 | 4       | 5 | 6 | 7        |
|  | strongly |   |   | neutral |   |   | strongly |
|  | disagree |   |   |         |   |   | agree    |
13. I don't feel very good about the way my coach talks to me.
- |  |          |   |   |         |   |   |          |
|--|----------|---|---|---------|---|---|----------|
|  | 1        | 2 | 3 | 4       | 5 | 6 | 7        |
|  | strongly |   |   | neutral |   |   | strongly |
|  | disagree |   |   |         |   |   | agree    |
14. My coach tries to understand how I see things before suggesting a new way to do things.
- |  |          |   |   |         |   |   |          |
|--|----------|---|---|---------|---|---|----------|
|  | 1        | 2 | 3 | 4       | 5 | 6 | 7        |
|  | strongly |   |   | neutral |   |   | strongly |
|  | disagree |   |   |         |   |   | agree    |
15. I feel able to share my feelings with my coach.
- |  |          |   |   |         |   |   |          |
|--|----------|---|---|---------|---|---|----------|
|  | 1        | 2 | 3 | 4       | 5 | 6 | 7        |
|  | strongly |   |   | neutral |   |   | strongly |
|  | disagree |   |   |         |   |   | agree    |

Sport Climate Questionnaire. From Deci & Ryan (n.d.) Perceived Autonomy Support: The Sport Climate Questionnaire.  
[http://www.psych.rochester.edu/SDT/measures/auton\\_sport.html](http://www.psych.rochester.edu/SDT/measures/auton_sport.html)

## APPENDIX 11

## Injury Rehabilitation Questionnaire

This questionnaire contains items that are related to your experience with your physiotherapist during your rehabilitation. Physiotherapists have different styles in dealing with athletes, and we would like to know more about how you have felt about your encounters with your physiotherapist. Your responses are confidential. Please be honest and candid.

1. I feel that my physiotherapist has provided me choices and options.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
2. I feel understood by my physiotherapist.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
3. I am able to be open with my physiotherapist at our meetings.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
4. My physiotherapist conveys confidence in my ability to make changes.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
5. I feel that my physiotherapist accepts me.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
6. My physiotherapist has made sure I really understand about my condition and what I need to do.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
7. My physiotherapist encourages me to ask questions.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
8. I feel a lot of trust in my physiotherapist.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
9. My physiotherapist answers my questions fully and carefully.
 

1	2	3	4	5	6	7
strongly disagree			neutral			strongly agree
  
10. My physiotherapist listens to how I would like to do things.

- |  |          |   |   |         |   |   |          |
|--|----------|---|---|---------|---|---|----------|
|  | 1        | 2 | 3 | 4       | 5 | 6 | 7        |
|  | strongly |   |   | neutral |   |   | strongly |
|  | disagree |   |   |         |   |   | agree    |
11. My physiotherapist handles people's emotions very well.
- |  |          |   |   |         |   |   |          |
|--|----------|---|---|---------|---|---|----------|
|  | 1        | 2 | 3 | 4       | 5 | 6 | 7        |
|  | strongly |   |   | neutral |   |   | strongly |
|  | disagree |   |   |         |   |   | agree    |
12. I feel that my physiotherapist cares about me as a person.
- |  |          |   |   |         |   |   |          |
|--|----------|---|---|---------|---|---|----------|
|  | 1        | 2 | 3 | 4       | 5 | 6 | 7        |
|  | strongly |   |   | neutral |   |   | strongly |
|  | disagree |   |   |         |   |   | agree    |
13. I don't feel very good about the way my physiotherapist talks to me.
- |  |          |   |   |         |   |   |          |
|--|----------|---|---|---------|---|---|----------|
|  | 1        | 2 | 3 | 4       | 5 | 6 | 7        |
|  | strongly |   |   | neutral |   |   | strongly |
|  | disagree |   |   |         |   |   | agree    |
14. My physiotherapist tries to understand how I see things before suggesting a new way to do things.
- |  |          |   |   |         |   |   |          |
|--|----------|---|---|---------|---|---|----------|
|  | 1        | 2 | 3 | 4       | 5 | 6 | 7        |
|  | strongly |   |   | neutral |   |   | strongly |
|  | disagree |   |   |         |   |   | agree    |
15. I feel able to share my feelings with my physiotherapist.
- |  |          |   |   |         |   |   |          |
|--|----------|---|---|---------|---|---|----------|
|  | 1        | 2 | 3 | 4       | 5 | 6 | 7        |
|  | strongly |   |   | neutral |   |   | strongly |
|  | disagree |   |   |         |   |   | agree    |

Injury Rehabilitation Questionnaire. From From Deci & Ryan (n.d.) Perceived Autonomy Support: The Sport Climate Questionnaire.  
[http://www.psych.rochester.edu/SDT/measures/auton\\_sport.html](http://www.psych.rochester.edu/SDT/measures/auton_sport.html)

## APPENDIX 12

**Consent Form**

*Title:* The psychology of anterior cruciate ligament (ACL) injury rehabilitation amongst professional rugby union players.

*Aims:* The main aim of this study is to investigate the thoughts, feelings, actions, coping mechanisms, emotional responses and psychological effects associated with rehabilitation from an anterior cruciate ligament (ACL) injury amongst professional rugby union players. This study will be conducted concurrently with the athlete's injury, allowing for a more comprehensive investigation. By having regular contact with the injured athlete it is expected that all psychological experiences will be highlighted as they happen, providing a more valid and complete investigation of the psychological factors involved with anterior cruciate ligament (ACL) rehabilitation of professional athletes.

*Methods:* There will be a mixed methodology approach to this study, utilizing qualitative interviews and diary entries, as well as quantitative assessment with each athlete. Athletes will be interviewed on a regular basis during their time in rehabilitation. Each interview will last up to 30 minutes and will be tape-recorded. All athletes will also be asked to complete elements of six questionnaires at established times during their rehabilitation. The researcher will provide the questions at the time when these are to be completed. Each athlete will also be asked to complete a pre-designed diary, recording changes in their thoughts, feelings and behaviours. The researcher will inform each athlete when to progress onto each section of the diary.

*Data Analysis:* All tape-recorded interviews will be transcribed verbatim and each placed into the correct phase in accordance to the athlete's rehabilitation. These interview transcripts will be analyzed using hierarchical content analysis. First there is the detailed examination of the data to identify topics that best describe particular segments of text. Secondly, there is the determination of common features that characterize the text segments in order to create and understand the relationship between topics. Analysis of the diary / journal entries will be conducted using similar methods. The six questionnaires will be used to support the information gathered within the interviews and diary entries.

I understand that all information and results will be treated confidentially, in line with the Data Protection Act (1998), and that my name will not be present on any transcripts. As such the information provided will not be passed to or viewed by others involved in the rehabilitation (i.e. coaches, medical staff, physiotherapists, trainers, etc.). I also understand that I may withdraw from the research at any time and without any prior warning.

Athlete: \_\_\_\_\_

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

Researcher: \_\_\_\_\_

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

Researcher's Contact Details:



## APPENDIX 13

**Initial Injury –**

1. What are your recollections of how the injury occurred?

2. What were your initial thoughts?

*Probe: - Can you describe your reaction?*

3. Describe your emotions when told the severity of the injury?

*Probe: - Were you able to accept that decision? How?*

4. What have you done to help yourself to cope with the initial injury?

5. Have you suffered a previous injury that was similar in severity?

*Probe: - Do you think this will influence your rehabilitation?*

**Pre-Surgery Phase –**

1. How do you feel about the up coming surgery?

2. Describe what you have done to help cope with the surgery?

*Probe: - Explain the support you have available (positive / negative?)*

*- Explain any psychological skills utilised (positive / negative?)*

3. What are your thoughts and feelings about the injury and being injured?

4. How has being injured affected you?

**Post-Surgery Phase –**

1. What were your initial thoughts following surgery?

2. How have you coped since the injury?

*Probe: - Explain what you have done / support available / psychological skills used.*

3. Do you feel ready to begin the rehabilitation process?

*Probe: - What are your initial aims?*

*- How have these been developed?*

4. Do you have any concerns about the rehabilitation?

*Probe: - Explain how these influence you.*

5. Are there any concerns about the injury?

*Probe: - Explain how these influence you.*

6. Describe your current emotions.

**Early Limited Participation Phase & Late Limited Participation Phase**– (same questions used for all interviews during both phases)

1. What are your thoughts and feelings related to the injury?

2. Describe your thoughts and feelings regarding your rehabilitation.

3. Have you noticed any differences in your general thoughts and feelings?

Explain.

4. Do you feel the rehabilitation is progressing at the right pace?

*Probe: - (if negative) what effect does this have?*

5. What are your current rehabilitation goals?

*Probe: - How have these been set?*

6. How are you coping with the injury?

7. How are you coping in general?

8. What do you do to assist yourself in coping with the injury?

*Probe: - Explain the benefits of this social support.*

*- Explain the benefits of these psychological skills.*

9. Have you experienced any setbacks?

*Probe: - How have you coped with these?*

*- What affect has it had on you?*

### **Return-to-Play Phase –**

(Pre-Game 1)

1. Describe your thoughts and feelings relating to the injury?
2. How do you feel about returning to competition?
3. What have you done to help yourself prepare?

*Probe: - Explain how this has helped.*

4. What support have you received?

*Probe: - Explain how this has helped.*

(Post-Game 1)

1. What were your thoughts and feelings leading up to the first game?
2. What did you do to help you cope?
3. How did your coaches / teammates / medical staff treat you?
4. What were your feelings running onto the field?
5. Were any specific goals / targets set for you?

*Probe: - Who set these goals?*

*- How effective were they?*

6. Describe your thoughts on first contact?
7. Was the injury still a concern?
8. What were your thoughts and feelings after the game?

(Post-Game 3)

1. Describe your thoughts and feelings before the last 2 games?

2. Did you use any particular coping strategies?

*Probe: - How were these helpful?*

3. Were there any concerns regarding the injury?

4. Describe the support available to you.

*Probe: - How did this help?*

5. Were any specific targets set?

*Probe: - How did these benefit you?*

*- Who set these goals?*

6. How do you now feel about the injury?

#### **Final Interview –**

1. How have your thoughts changes since initial injury?

2. What was the most influential emotion during each phase of the rehabilitation?

3. What has been the most important factor in your successful rehabilitation?

4. What was the most affective coping strategy you used?

*Probe: - Did these change throughout the rehabilitation?*

APPENDIX 14

THE PSYCHOLOGY OF ANTERIOR  
CRUCIATE LIGAMENT INJURY  
REHABILITATION AMONGST  
PROFESSIONAL RUGBY PLAYERS

A RESEARCH PROJECT CONDUCTED BY

FRASER CARSON

AS PART OF A DOCTORAL THESIS FOR THE UNIVERSITY OF HULL

*Athlete Diary*

Thank you for agreeing to participate in this research project, investigating rehabilitation from ACL injury. This diary is to record primarily your thoughts and feelings as you progress through your rehabilitation. It also contains some specific questions and questionnaires to assist with gaining a complete overview of the factors associated with the rehabilitation process.

The information gathered within this diary will be kept in complete confidentiality, in line with the Data Protection Act (1998), and will only be seen by the researcher. As such the information you provide will not be passed to or viewed by others involved in your rehabilitation i.e. coaches, medical staff, physiotherapists, trainers, etc.

Please note that there are no wrong answers to any of the questions and the research is solely focussed on the thoughts and feelings you experience during the rehabilitation. Please complete the information as honestly and thoroughly as possible.

You have been asked to voluntarily supply all information and it is noted that you may withdraw your participation in this study at any stage and without any prior warning.

Thank you again for your cooperation.

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

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

CONTENTS

## Points to Note

- Section 1 Initial Injury
- Section 2 Pre-Surgery
- Section 3 Post-Surgery
- Section 4 Early Limited Participation Phase
- Section 5 Late Limited Participation Phase
- Section 6 Return-to-Play Phase
- Section 7 Final Overview
- Section 8 Additional Space
- Section 9 Researcher Contact Details

POINTS TO NOTE

When completing the various sections of the diary, you are asked to consider some of the following points:

1. Changes in feelings towards injury and not being able to participate
2. Things that you have done to cope
3. The affect that any setbacks have
4. Types of social support you have received
5. Your relationship with the medical staff and rehabilitation team
6. The affect the injury is having on your lifestyle
7. General thoughts and feelings



SECTION 1 – INITIAL INJURY

Date injury occurred:

Situation where injury occurred (i.e. game, practice, etc.):

How did the injury occur?

What were your initial thoughts when the injury occurred?

When you were told the diagnosis did these change? How?

SECTION 2 – PRE-SURGERY

Date of surgery:

What are your thoughts and feelings leading up to the surgery?

What have you done to help you cope with the surgery ahead?

What are your thoughts and feelings towards the injury?

Is the injury affecting your lifestyle? How?

SECTION 3 – POST-SURGERY

What are your initial thoughts and feelings immediately after surgery?

What are you doing to help you cope since the surgery?

Are you now focussed on your rehabilitation?

Did you have any concerns regarding the rehabilitation program? Explain.

#### SECTION 4 – EARLY LIMITED PARTICIPATION PHASE

This phase is concerned with the early part of the rehabilitation program, where the main emphasis is on regaining the range of movement in the knee joint and muscle strength.

What are your thoughts and feelings relating to your rehabilitation?

What are your general thoughts and feelings?

Do you think the rehabilitation has progressed at the right pace?

How do you feel you are coping with the injury? What things have you done to help you cope?

Have you experienced any setbacks during your rehabilitation? How have these affected you?

Have you had any input on the goals set for your rehabilitation? What affect has this had on you?

### SECTION 5 – LATE LIMITED PARTICIPTION PHASE

This phase concentrates on the final part of your rehabilitation from injury, where the emphasis is on more sports specific training and the final preparation for full fitness.

What are your thoughts and feelings relating to your rehabilitation?

What are your general thoughts and feelings?

Do you think the rehabilitation has progressed at the right pace?

How do you feel you are coping with the injury? What things have you done to help you cope?



Have you experienced any setbacks during your rehabilitation? How have these affected you?

Have you had any input on the goals set for your rehabilitation? What affect has this had on you?

## SECTION 6 – RETURN-TO-PLAY PHASE

This phase is focussed on the final training sessions before you return to competition and with the first few games you compete in after your full rehabilitation.

Do you feel ready to return to play? Explain how.

Have you had any goals set for your first games back? What affect do you feel this has?

What were your feelings returning to competitive action?

How did you feel after the first game / games back?

Was the injury still a concern? Explain how.

Have you done anything differently to help you cope with return to competition after your injury?

SECTION 7 – FINAL QUESTIONS

Do you feel the length of time before you accepted the severity of the injury affected your rehabilitation? How?

What was the most important factor in your successful rehabilitation?

What was the most affective coping strategy that you used during your rehabilitation?

Did the influence of social support change from different people (i.e. coach, family, teammates, etc.) throughout the rehabilitation process? Explain in detail the affects of each person.

Did you have any psychological help throughout the rehabilitation (i.e. using imagery / visualisation, relaxation techniques, etc.)? How did these assist you?

SECTION 8 – ADDITIONAL SPACE

Please use this section for additional space needed for a previous question, marking clearly where the information is continued from. Also if you feel that other issues that are important for this investigation have not been previously discussed, please identify them here.

