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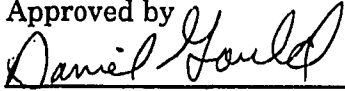
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EXAMINING MOOD, COPING, AND SOCIAL SUPPORT
IN THE CONTEXT OF ATHLETIC INJURIES

by
Eileen M. Udry

A Dissertation Submitted to
the Faculty of The Graduate School at
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of the Requirements for the Degree
Doctor of Philosophy

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It has recently been estimated that approximately 17 million injuries occur each year in the United States as a result of individuals' participation in sports or physical activity (Booth, 1987). Unfortunately, there is a dearth of empirically derived knowledge about the psychological processes and behavioral outcomes that follow athletic injuries (Brewer, 1994). This research focused on the psychosocial variables associated with athletic injuries, rehabilitation adherence and physical recovery. Specifically, time changes in mood, coping strategies, and social support were examined following the occurrence of anterior cruciate ligament (ACL) injuries among 25 recreational athletes. In addition, the above mentioned psychosocial variables were also examined as predictors of injury rehabilitation and recovery.

Using a repeated measures design, individuals who experienced ACL knee injuries and underwent surgery completed a battery of psychological assessments at five times: Pre-surgery, 3, 6, 9, and 12 weeks Post-surgery. A series of repeated measures MANOVAs revealed statistically significant time changes in mood disturbances, three types of coping (instrumental, negative emotion, and palliative), and rehabilitation adherence with effect sizes ranging from .13 to .22. In general, mood disturbances, instrumental coping, negative emotion coping, palliative coping, and adherence were highest during the three weeks following surgery but declined significantly from weeks three through nine. Significant time effects were not observed for social support or the use of

distraction coping, although individuals' perceived satisfaction with their social resources was lowest during the three weeks following surgery.

To examine whether mood, coping, and social support were significant predictors of adherence, a series of multiple stepwise regression analyses were conducted. None of the above mentioned variables were shown to be significant predictors of adherence. Instead, the most reliable predictor of adherence at weeks 6, 9, 12 Post-Surgery was adherence from the previous assessment period.

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CHAPTER I

INTRODUCTION AND LITERATURE REVIEW

Walking into a sports medicine clinic or athletic training room on any given day will provide an onlooker with a wide range of human behavior to observe. Some athletes seem to take their injury “in stride” and have been able to somehow put their injury into perspective. A case in point is Leslie Visser, the CBS sportscaster who suffered multiple injuries including a dislocated hip, in a freak running accident. Despite the seriousness of her injury, when faced with a lengthy rehabilitation process Visser remarked that she always tried to look “at my glass as half full” [Leslie Visser (Donaldson, 1994, p. 35)]. Visser approached her rehabilitation with an energy that won her the admiration of her physical therapists and surgeon alike. In contrast, other individuals seem to struggle more with the pain, loss of mobility and sense of frustration that accompanies their injuries. Why do some athletes cope with their injuries so differently than others? Are there certain psychosocial resources that individuals draw upon that make it more likely that they will adhere to their rehabilitation programs? Researchers in the sport science and medical realms know surprisingly little about the answers to these questions or similar psychologically-based issues related to injury rehabilitation (Brewer, 1994; Duda, Smart, & Tappe, 1989; Mainwaring & Day, 1993).

The sparse literature concerning the psychological aspects of the rehabilitation process is especially startling given the prevalence of injuries. It has recently been estimated that some 17 million injuries occur each year in the United States as a result of individuals' participation in some form of physical activity (Booth, 1987). These injury statistics are even more troublesome when one considers that there have been significant advances in training techniques, coaching practices, facilities, and equipment (Bergandi, 1985). Moreover, epidemiological evidence points to a relatively high incidence of injuries at various levels of sport participation (Whieldon & Cerny, 1990). Indeed, injuries have been referred to as the "great equalizer" by noted sports medicine surgeon Richard Steadman because, regardless of experience or ability, no athlete is immune to injury (Steadman, 1993).

In recognition of the tremendous emotional and financial costs of sports injuries, the National Institute of Arthritis, Musculoskeletal, and Skin Diseases has designated sports injuries as a major health issue (Booth, 1987). Such designations by major health organizations have served to stimulate research on the prevention and treatment of sport injuries. However, the vast majority of this research has examined injuries from physical (e.g., muscle imbalances, biomechanical deficiencies) or environmental (e.g., training surfaces) perspectives. More recently there has been a growing awareness of the integral role of psychosocial factors during the injury process (Gould & Udry, 1994; Hardy & Crace, 1993; Nideffer, 1983).

What psychologically based injury research that has been conducted has tended to examine injuries from one of two perspectives. First, there is a body of literature that has been concerned with psychosocial factors that may function as *antecedents* to the occurrence of athletic injuries (e.g., Fields, Delaney, & Hinkle, 1990; Passer & Seese, 1983; Petrie, 1992; Petrie, 1993). It is this line of research that has dominated the landscape of psychologically based injury research (Andersen & Williams, 1988; Duda et al., 1989).

A second line of injury research has focused on the psychological processes and behavioral outcomes that follow injuries. Unfortunately, the work in second area of inquiry is still in its infancy and has tended to be neither theoretically nor empirically based (Brewer, 1994). Thus, while the continued efforts of sports scientists examining the psychological antecedents to injuries is considered appropriate, the fact is millions of individuals do indeed become injured each year and we are severely limited in our psychologically-based knowledge of how to facilitate the rehabilitation process. The research proposed here is an incipient attempt to make a contribution to the void that exists with regard to this second line of research.

The specific purposes of this investigation are five-fold. The first purpose is to describe the psychosocial and behavioral characteristics among a sample of injured athletes who have experienced relatively severe, acute injuries. The second purpose is to examine whether individuals' moods, coping strategies, and social resources change during the course of recovery from their injuries. The third purpose is to examine whether

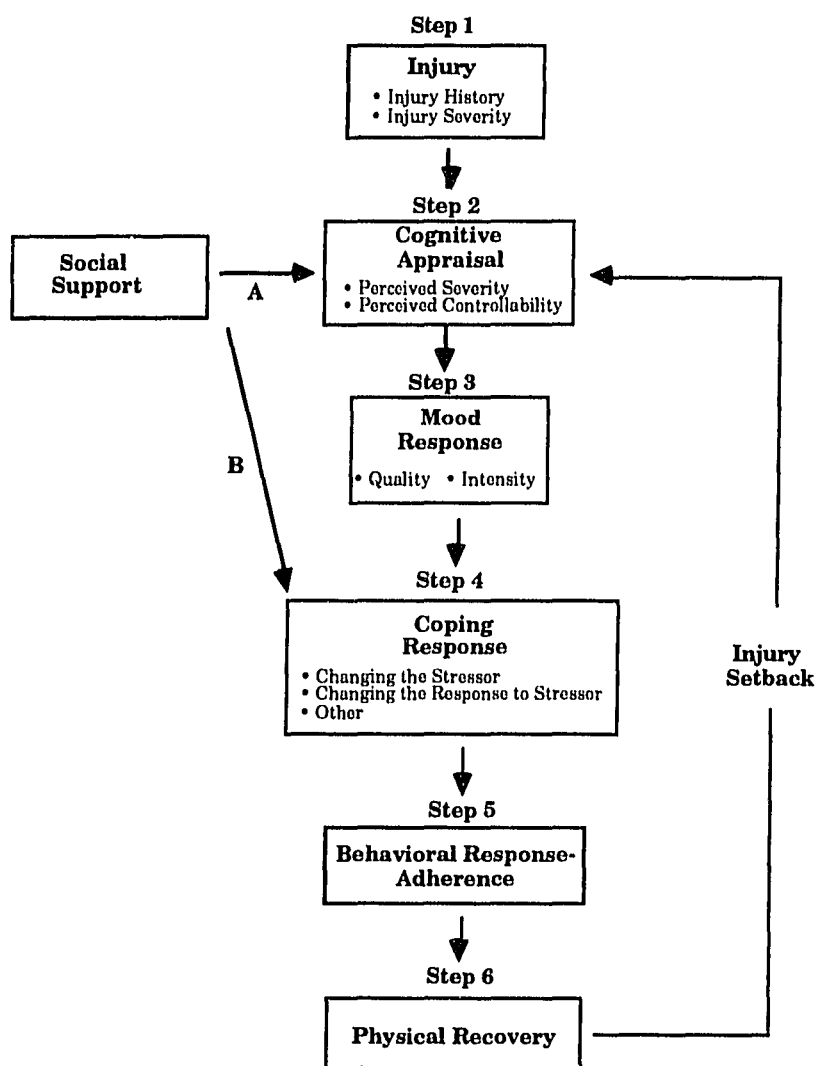
certain psychosocial factors— moods, coping strategies, and social support—are predictors of injury rehabilitation adherence and physical recovery. The fourth purpose is to examine potential interactions between the above mentioned psychosocial variables as they relate to rehabilitation adherence. The fifth and final purpose is to explore the relationship between rehabilitation adherence and recovery.

Before proceeding it seems important to clarify the perspective that has guided this discussion. First, it can be noted that throughout this discussion the term “athlete” will be used. This term refers to both the individual who participates in competitive sport as well the individual who might be considered an “exerciser” or recreational athlete.

Second, an injury response model is presented at this time as it has significant implications for the remainder of this discussion (see Figure 1). The model presented here is not original, but is a synthesis of models recently forwarded by Brewer (1994), and Wiese-Bjornstal and Smith (1993). In turn, the models of Brewer (1994) and Wiese-Bjornstal and Smith (1993) are based on Lazarus and Folkman’s (1984) analysis of the stress process, Cohen and Wills’ (1985) stress-buffering model, Weiss and Troxel’s (1986) psychophysiological stress model, and Andersen and Williams’ (1988) model of athletic injury occurrence. The model in Figure 1 will be referred to throughout this review, so an introduction is provided here to establish the conceptual framework that has guided the remainder of this review. It can be observed that this model represents a simplified version of the stress process. It is acknowledged that the stress process is undoubtedly more

complex than what will be described here; however, the relationships depicted are thought to include the key components of the stress process.

Figure 1. Injury Response Model



Injury Response Model: Injury As A Stressor

The injury response model shown in Figure 1 is rooted in the extant literature on stress. Thus, in order to understand athletes' responses to injuries, one must first have an understanding of stress. Consistent with contemporary theory and research on stress (Lazarus & Folkman, 1984; McGrath, 1970; Passer, 1982; Smith, 1986), stress is conceptualized as a process or a transaction between individuals and their environment. The first step of the process consists of the objective environmental situation, which in this case is the injury itself. Unfortunately, in much of the psychologically based injury literature there is not a distinction made as to what type of injury has taken place (e.g., whether the injury is of a chronic or acute nature). It is thought that the psychological sequelae surrounding a chronic injury (e.g., patellar tendonitis resulting from overuse) may be quite different than that associated with an acute injury (e.g., torn anterior cruciate ligament due to a severe blow to the knee joint). Thus, in the interest of clarity, when the term "injury" is used throughout this discussion it will refer only to acute injuries.

The second step of the model consists of athletes' cognitive appraisal or perception of their injury. It is predicted that athletes may vary considerably with regard to their cognitive appraisal of their injury. For instance, some athletes may view their injury as a threat to their identity, whereas others may perceive their injury as a relief from intense training demands. Additionally, the severity of the injury and athletes' previous injury history are thought to play an important role in how an injury is cognitively appraised. Thus, understanding that an injury has occurred is

not considered as important as understanding how the injury is cognitively appraised or perceived (Brewer, 1994).

The third step of this stress model focuses on the mood responses to injuries and postulates that cognitive appraisals will influence the mood responses to injuries. Thus, it would be predicted that if an injury is appraised as threatening, the resulting mood response will be marked by heightened anxiety or other forms of distress. The attendant mood response is thought to influence the type of coping response that is employed to deal with the injury (Step 4). While the specific types of coping response that may be called upon to deal with stress will be discussed in greater detail later, for the current discussion it is only important to note that the type of coping strategy employed is thought to have behavioral implications and may influence the degree to which athletes adhere to their injury rehabilitation programs (Step 5). The final step of this model is physical recovery which is thought to be strongly, although not entirely, influenced by the degree to which athletes adhere to their injury rehabilitation programs.

Another component of this model that bears mentioning is its recursive nature (as shown in the right part of Figure 1). The stress process is viewed as an ongoing process in which stressors are continually appraised and responded to. One situation in particular that may result in a change in the cognitive appraisal of an injury is the experience of significant setbacks in physical recovery (e.g., an athlete falls and tears his/her surgical repairs). While certainly not all athletes experience injury setbacks, when a setback does occur it is thought that this will result in the

injury being cognitively reappraised and consequently have an impact on the ensuing mood and behavioral responses.

As depicted in the left part of Figure 1, social support is thought to have a stress buffering effect on the stress process with the potential to intervene in the stress process at one of two points (arrows A and B). First, social support may intervene between stressful events and stress reactions by attenuating the cognitive appraisal of events as stressful (arrow A). In other words, the perception that others can and will provide the necessary resources to deal with stressors may alter the perceived potential for harm and thereby prevent a particular event or situation from being perceived as stressful (Cohen & Wills, 1985). When viewed in this manner social support functions as a moderator variable. Second, adequate social support may intervene between the experience of stress and the behavioral response (adherence) and recovery by reducing or eliminating the effects of stress once it has occurred (arrow B). For instance, in the face of stressors individuals may turn to significant others for help and through their interactions with these individuals the stress process is ameliorated. Under these circumstances social support functions as a mediator variable.

To reiterate, the injury model presented here is not original but is based on extensive research in the areas of stress and coping. Researchers in the past have focused their efforts on different aspects of the stress process model. For instance, the Cohen and Wills (1985) have provided an extensive review of social support as it relates to the stress and coping processes. Folkman and Lazarus (1988) have explored the role of emotions in influencing the use of coping responses. This discussion will be

concerned with the relationship between mood, coping, and social support, but always within the context of how these variables may directly or indirectly impact rehabilitation adherence and recovery. Of the two outcome variables thought to be of central importance, the first is a behavioral one, namely, injury rehabilitation adherence. The second is a health outcome variable, namely, physical recovery. Before beginning it seems appropriate to more explicitly discuss the rationale for the inclusion of rehabilitation adherence and physical recovery as outcome measures.

Rehabilitation Adherence and Recovery as Outcome Measures

Two implications follow from the injury response model presented in Figure 1. The first implication relates to the appropriateness of physical recovery as the final outcome measure of consideration; the second implication concerns the relationship between adherence and physical recovery.

With regard to the implication that physical recovery be used as the final outcome measure, it can be noted that only rarely have investigations examining the psychological aspects of athletic injuries included *physical recovery* as an outcome measure. While physical recovery has been explored extensively as an outcome measure in the health psychology literature (e.g., King, Reis, Porter, & Norsen, 1993; Wilcox, Kasl, & Berkman, 1994), there appears to be only one study in the sport psychology literature which has used physical recovery as an outcome measure (Ievleva & Orlick, 1991). Ievleva and Orlick (1991) examined the relationship between psychological variables and physical recovery rates among athletes who experienced knee and ankle injuries. Significant correlations were found

between the use of goal setting, positive self-talk, and healing mental imagery and recovery rates. Given the appeal associated with having injured athletes regain their previous level of physical functioning, it would seem that the use of physical recovery as an outcome measure would be the rule rather than the exception.

Recently there has been a call for the inclusion of health outcomes measures in research designs (Brewer, 1994; Kaplan, 1990). As Brewer has noted, "If research on psychological adjustment is to have an impact on the care of injured athletes by the sports medicine team, it is critical to address the 'bottom line' in sports medicine-recovery of physical functioning" (p. 94). Consistent with this line of reasoning, athletes' physical recovery will be viewed as the outcome measure of central importance throughout this review.

Given the presumed importance of physical recovery, the next question becomes: What factors influence physical recovery? As noted previously an implication of the model presented in Figure 1 is that adherence will have a strong influence on athletes' physical recovery. Admittedly, the correlation between rehabilitation adherence and recovery is not perfect because factors unrelated to adherence may influence recovery rates. For instance, medical specialists report that certain individuals are physiologically prone to tissue swelling or producing scar tissue, both of which slow recovery from surgery and may occur independent of adherence (Shelbourne & Nitz, 1990; Shelbourne & Wilckens, 1990). However, in the main, research has supported the positive

relationship between rehabilitation adherence and recovery (Shelbourne & Wilckens, 1990).

Given that there is a strong link between rehabilitation adherence and recovery the focus then turns to issues related to enhancing adherence. Unfortunately, the current body of knowledge is such that we know more about what happens when athletes do not adhere to their rehabilitation programs, than we do about how to enhance adherence. Specifically, it is known that health complications may occur when injured athletes do not adhere to their rehabilitation programs (Heil, 1993). For example, if rehabilitation does not consistently follow most surgical procedures there is an increased risk of scar tissue buildup, which then compromises the range of motion about a joint. Additionally, lack of compliance to rehabilitation programs may result in muscle imbalances, putting athletes at an increased risk of reinjury (Heil, 1993).

Despite how prudent it may be for athletes to adhere to their rehabilitation programs, sports medicine providers report that noncompliance to rehabilitation programs is a significant problem (Fisher, Domm, & Wuest, 1988; Weiss & Troxel, 1986). However, the problem of nonadherence to medical regimens is not the exclusive province of injured athletes as this has been a source of concern for professionals in medical, fitness, and public health domains (Blumenthal, Williams, Wallace, Williams, & Needles, 1982; Fields, 1989; Malec & Neimeyer, 1983; Rothert & Talarczyk, 1987). Even when a medical regimen is as simple as taking a prescription drug, 30-60% of all patients fail to take their medications in the manner in which they have been prescribed (Meichenbaum & Turk, 1987).

Furthermore, while it may be tempting to assume compliance rates would be higher when the health consequences of noncompliance were relatively severe, among patients recovering from potentially fatal myocardial infarctions, it is not unusual for over 50% of the patients to drop out of their rehabilitation programs (Erling & Oldridge, 1985).

To conclude, rehabilitation adherence and physical recovery are viewed as outcome variables worthy of future psychology of injury research. Having stated this, the focus turns to examining the factors thought to be related to enhancing these outcome variables. In order to limit the scope of this review only the potential role of emotions, coping, and social support will be explored in relation to their impact on rehabilitation adherence and recovery.

Mood Responses to Injury

Athletes who experience injuries often find themselves in an emotional maelstrom. Danish (1986) has noted that injuries can be particularly stressful for athletes because not only is their physical well being threatened but also their belief system, self-concept, social network, emotional equilibrium, and in some cases their occupational functioning. The problems athletes experience in dealing with their injuries may be exacerbated by what May and Sieb (1987) have referred to as the myth of the "super healthy" athlete. The myth of the "super healthy" athlete, thought to be held by the general public and some health professionals, assumes that if athletes do become injured or ill, it is with less frequency and that they are somehow better able to cope and rehabilitate than other segments of the population. However, there is little evidence to support the notion that

athletes are somehow endowed with extra-ordinary capacities to deal with injuries. Nonetheless, the myth of the super healthy athlete prevails and may function as a means of intensifying the distress of athletes to injuries because many of those who come in contact with injured athletes may not recognize the potentially devastating impact of injuries for athletes.

In an effort to gain insight into athletes' emotional reactions to injuries researchers have tended to adopt one of two perspectives: (1) stage models or (2) cognitive appraisal models. The following section provides an overview and critique of these two approaches.

Stage Models

In absence of empirical data on mood reactions to athletic injuries a number of authors (Lynch, 1988; Pederson, 1986; Wehlage, 1980) have applied models of grief and loss. One of the most prevalent adaptations that has been used borrows from Kubler-Ross's (1969) work with terminally ill patients. According to this model, the reactions of athletes to injury is characterized by five stages: (1) denial, (2) anger, (3), bargaining, (4) depression, and (5) acceptance. These five stages of grief are detailed as follows:

- (1) **Denial:** When athletes are initially injured it is thought that they enter a state of shock or disbelief regarding their injury. Athletes may downplay the seriousness of an injury or not acknowledge the implications of the injury. Karl Fields, a primary care physician, has written on the topic of denial among myocardial infarction patients. Fields notes that cardiac patients in denial are not likely to complain about pain and are unlikely to alter their daily

activities or work schedules (Fields, 1989). To the extent that family, friends, or medical providers marvel at the pain threshold or apparent “commitment” of ill or injured individuals who are in denial, this stage may persist due to social reinforcements.

- (2) **Anger:** Once the reality of the injury becomes apparent, a sense of loss and frustration sets in. Injured athletes may adopt a “Why me?” attitude which focuses on the seeming unfairness of their injury.
- (3) **Bargaining:** At this phase of the grief process, athletes may attempt to rationalize or intellectualize their injury. For instance, athletes may attempt to convince a coach, trainer or themselves that if they can get over their injury they will only play to the end of the season.
- (4) **Depression:** As athletes come to terms with the reality of their injury and consequences, they may respond by withdrawing and engaging in self-pity.
- (5) **Acceptance:** In the final stage of the grieving process is characterized by athletes’ acceptance of their injury and its consequences.

It can be noted that other stage models besides the work of Kubler-Ross (1969) model have been forwarded. Wehlage (1980) has suggested that the injury grief process involves three stages: *protest*, *hopelessness*, and *reorganization*. Hardy and Crace (1990) assert that mood responses to injury follow a two-step process. More specifically, it is thought that initially there is a *reactive phase* characterized by negative emotions such

as denial, anger, and shock. This initial reactive phase is then followed by an *adaptive phase* marked by more positive emotions such as acceptance, hope, and a sense of self-confidence.

In summary, numerous stage models have been proposed to explain injured athletes' mood responses to injury. Differences between these models are evident in the number of proposed stages and emotions that characterize each stages. However, an underlying assumption of each of the stage models is that injured athletes will inevitably reach a state of resolution or acceptance regarding their injuries after experiencing some type of psychological reaction and reorganization (Brewer, 1994).

Critique of the Stage Models

Despite the intuitive appeal of stage approaches to explain athletes mood reactions to injuries, these approaches have been criticized on a number of grounds (Brewer, 1994). First, there has been a tendency to borrow stage models that have been developed with nonathletic populations (e.g., terminally ill patients) and assume that they will be applicable to athletic populations. However, the judiciousness of such an approach has been questioned because the models have not been subjected to empirical testing in the population to which they are being applied (Mainwaring & Day, 1993).

Another problem with stage models such as those developed by Kubler-Ross (1969) is the difficulty associated with adequately assessing individuals on emotions such as "denial" through self-report assessments completed prospectively. If athletes are in denial regarding their injury it would seem unlikely that they would be able to recognize and articulate this

through a self-report inventory. To tap constructs such as denial it may be necessary to rely on retrospective assessments and/or behavioral observations. Until such retrospective reports or behavioral observations methods are available some of the stage models may not be able to be subjected to scientific scrutiny.

A third criticism of stage approaches is that they assume that individuals proceed linearly and sequentially through mood stages (Brewer, 1994). Silver and Wortman (1980) conducted a comprehensive review of the literature on coping with undesirable life events, including physical injury, and concluded that there is not substantial evidence to support the conclusion that a sequential, orderly pattern of mood responses occurs following negative life events.

Related to the above, a potentially problematic assumption of stage models is that they assume at a certain point athletes reach some type of resolution or acceptance regarding their injuries. While such an assumption may provide a sense of comfort for those working with injured athletes, it may not be factually based. Ogilvie and Howe (1982) found that athletes who incurred career-ending injuries often turned to substance abuse as a method of coping with the pain of this loss. Similarly, Kleiber, Greendorfer, Blinde, and Samdahl (1987) followed athletes who retired and examined their life satisfaction levels. They found that athletes who had been forced into retirement as a result of career ending injuries had significantly lower scores on life satisfaction than did those who had chosen to retire from sport. Taken together, the work of Ogilvie and Howe (1982) and Kleiber and colleagues (1987) suggests that mood responses to injuries

do not *necessarily* culminate in a stage of acceptance or adjustment as would be suggested by various stage models.

Finally, a criticism of stage models is that they assume that the stages are discrete. For example, returning to the Kubler-Ross model it would be predicted that the second stage of the process would be dominated by feelings of anger and would precede the third and fourth stages which would be characterized by bargaining and depression. However, recent evidence suggests that athletes' mood responses to injuries may not be as specific or discrete as is implied by stage models. Smith, Scott, O'Fallon, and Young (1990) and McDonald and Hardy (1990) found that mood disturbances following injuries were more global in nature i.e., the subscales of the mood disturbance inventories used tended to be highly intercorrelated. Thus, if individuals reported feeling high levels of anger, they were also likely to report high levels of depression and anxiety. Hence, the available evidence has not provided strong support for the notion that mood reactions following injuries are marked by discrete stages.

To conclude, while there are limitations to the various stage approaches, a positive consequence of the adoption of these stage approaches has been a recognition that athletes often experience mood disturbances following injuries. However, the evidence suggests that mood disturbances following injuries may not be as sequential or discrete as is implied by the various stage approaches (Brewer, 1994).

Cognitive Appraisal Models

In reaction to the limitations associated with stage models, some researchers attempting to understand athletes' mood responses to injuries

have adopted cognitive appraisal models. Whereas stages models fail to account for individual differences in responses to athletic injuries, cognitive appraisal models have been developed to explain individual differences (Brewer, 1994). Cognitive appraisal models are based on the stress literature in which injury is viewed as a stressor. Numerous cognitive appraisal models have been forwarded and include Weiss and Troxel's (1986) psychophysiological stress model, and Wiese-Bjornstal and Smith's cognitive-emotional-behavioral model (1993). Each of the above mentioned cognitive appraisal models makes a unique contribution toward our understanding of athletes' response to injuries. However, a similarity of each of these models is that they all assert that the way in which athletes appraise or interpret their injuries will have emotional and behavioral consequences. Because cognitive appraisal models are consistent with current theoretical and empirical research in stress, and have formed that basis of the injury response model that has been presented here (see Figure 1) the specifics of each of these models will not be provided. They have been described here briefly in order illustrate how the cognitive appraisal approach differs from the stage model approach:

To summarize, the mood responses of athletes to injuries has been the subject of significant discussion. However, it can be noted that in order to describe the responses of individuals following an injury, researchers must have reliable and valid psychometric inventories. The following section will focus on issues related to measurement of mood responses to injuries.

Measurement of Mood Responses To Injuries

To reiterate, according to the stress model presented in Figure 1, athletes' mood response to injuries are thought to be a function of their cognitive appraisal of their injuries. For instance, an injury that is appraised as being severe or is in some way viewed as threatening is likely to bring about a heightened mood disturbances. One of the most frequently used self-report inventories that has been used to assess mood is the Profile of Mood States (POMS) (McNair, Lorr, & Droppelman, 1981).

The POMS was designed to be an efficient means of identifying and assessing transient affective states. The POMS consists of 65 items, and yields six scores: tension-anxiety, depression-dejection, anger-hostility, vigor-activity, fatigue-inertia, and confusion-bewilderment. A seventh score, a measure of total mood disturbance, can be obtained by subtracting the positive affect score (vigor-activity) from the sum of the remaining five negative affect scores.

More recently a shortened version of the POMS has been developed by Shacham (1983). The shortened version of the POMS was developed in an attempt to facilitate the use of the POMS with individuals who are under stress and/or pain. The shortened POMS yields the same subscales and is scored in the same way as the original POMS.

While the POMS (in its full and shortened forms) have been employed extensively in research settings, it should be noted that other inventories besides the POMS have been presented in the literature for assessing affective states. For instance, the Emotional Responses of Athletes to Injury Questionnaire (ERAIQ) has been developed by Smith, Scott, and Wiese

(1990). The fact that the ERAIQ was developed specifically for use with injured athletes would seem to make this assessment highly relevant. However, the ERAIQ was developed for use in clinical settings rather than for research purposes, and has not been subjected to rigorous psychometric testing. Thus, the psychometric qualities of the ERAIQ remain unknown. For this reason, various versions of the POMS have continued to be used within the sport sciences to assess mood states (McDonald & Hardy, 1990).

Relationship Between Mood Responses to Injury, Adherence, and Recovery

It is often assumed that the mood response experienced by athletes in reaction to an injury will have implications for their rehabilitation adherence (Hardy & Crace, 1990; May & Sieb, 1987; McDonald & Hardy, 1990). Intuitively, it seems to make sense that if athletes are experiencing distress emanating from their injuries, this will have a deleterious effect on the degree to which they adhere to their rehabilitation and thus, indirectly impede their recovery. Despite the face validity of such an argument, the link between mood responses to injuries and adherence is not well understood. This section will review the literature that has examined the relationship between mood, rehabilitation adherence, and recovery.

In examining studies outside of the sport science literature two studies have examined the relationship between negative affect and patient adherence (Blumenthal et al., 1982; Malec & Neimeyer, 1983). Blumenthal and colleagues (1982) assessed myocardial infarction patients on a variety of physiologic and psychological variables. Of the 35 patients who enrolled in a structured cardiac rehabilitation program, 14 of the patients had dropped out by the end of the first year. Patients who had enrolled in the program

differed from those who continued in the program on a number of psychological distress variables, namely, depression and anxiety. Additionally, patients who discontinued participating in the program were also higher on hypochondriac scores and lower on ego strength than those who continued. These differences in psychological attributes associated with nonadherence were found to be independent of physical status.

Malec and Neimeyer (1983) investigated the relationship between severity of distress/depression and rehabilitation outcome among 28 spinal cord injury patients as they entered the hospital for inpatient treatment. Regression analyses indicated that more distressed patients tended to require long hospitalization and showed lower levels of desirable self-care behaviors upon being discharged.

While the above mentioned studies suggest a link between mood, rehabilitation adherence, and recovery, a weakness of these studies is that subjects' mood responses were only assessed at one point in time, the outset of the study. This approach assumes that mood responses remain constant over time. However, consistent with most contemporary stress perspectives, Wiese and Weiss (1987) have noted "thoughts and emotions may be constantly changing over the course of the injury rehabilitation cycle" (p. 322).

In an effort to address the limitations posed by obtaining a single assessment of emotion during the rehabilitation process, McDonald and Hardy (1990) used the POMS to obtain four measures of athletes' mood during the rehabilitation process. Scores from the POMS were then compared to athletes' "perceived rehabilitation." Perceived rehabilitation

was measured through questions such as, "On a scale from 0% to 100%, what percent rehabilitation do you think you are at right now?" Thus, McDonald and Hardy were *not* measuring *actual* rehabilitation adherence (e.g., attendance records), or even the degree to which subjects perceived they were adhering to their rehabilitation program (as some have interpreted). McDonald and Hardy *were* measuring the relationship between affective states and the degree to which athletes felt they were making progress toward their physical recovery. The correlation between mood distress and perceived physical recovery was $-.69$. Based on this investigation it is not possible to directly link athletes' mood responses to objective measures of adherence or recovery. However, the results do seem to suggest that the greater the extent of athletes' mood disturbance, the less likely they are to express positive emotions regarding their rehabilitation.

Conclusions Regarding Mood Responses to Injury

While the mood responses to injuries have been examined using the stage and the cognitive appraisal approach, it is generally thought that the cognitive appraisal approach has greater utility for providing insight to the mood reactions of athletes following an injury. Research from medical settings (Blumenthal et al., 1982; Malec & Neimeyer, 1983) has provided preliminary evidence that there is a relationship between mood distress and adherence, and recovery. However, these relationships have not been firmly established in the sport science literature and it is suggested that the link between mood, adherence, and recovery needs to be explored in greater detail.

Coping

The importance of coping during the injury rehabilitation process has been presumed, although not empirically documented, by numerous authors (Andersen & Williams, 1988; Gordon, Milios, & Grove, 1991). Interviews with injured athletes has revealed that their greatest difficulties during rehabilitation were dealing with their anger and their inability to cope with injuries (Weiss & Troxel, 1986). Despite the assumed importance of coping during the rehabilitation process, there is a paucity of empirical research as it relates to specifically how injured athletes cope with injuries. Little is known about what types of coping strategies are used most frequently by injured athletes, if athletes' coping patterns change over the course of their rehabilitation, or what types of strategies are most effective in facilitating adherence and recovery.

In this section the current literature on coping as it relates to the above mentioned issues will be discussed. There will be four purposes of this discussion. First, a working definition of coping will be provided. Second, conceptual issues addressing the types of coping and the stability of coping strategies that are employed in the face of stressors will be discussed. Third, an overview of coping self-report inventories will be provided. Finally, research that has examined the relationship between coping, behavioral, and health outcomes will be reviewed (see Figure 1).

Defining Coping

Coping is a topic that has been widely discussed in the psychological literature but is also a concept frequently used in common parlance (Tunks & Bellissimo, 1988). This widespread usage has contributed to the

considerable confusion as to what precisely is meant by the term “coping.” In colloquial usage it is not unusual to hear someone remark that another individual is “coping well” or is “not coping well” with an adversity. When used in this manner coping refers to a judgment regarding the result of a behavior. Alternatively, the term “coping” is also used to refer to actions or cognitions that individuals employ to deal with a situation. However, when a word is used to indicate both an action and the judgment of the result of the action there is a risk of tautology, i.e., there is the possibility that anything a person does being considered “coping” (Tunks & Bellissimo, 1988). Thus, it seems obvious that a discussion of coping can only proceed once a definition of coping has been provided.

Historically, coping has been defined in a variety of ways. Early definitions of coping were based on one of two models: animal experimentation and psychoanalytic ego models (Houston, 1987). According to the animal experimentation model, coping was defined in terms of behaviors used by an organism to avoid aversive conditions and to satisfy drives. Consequently, research based on the animal experimentation model focused on the avoidance and escape behaviors of organisms. Numerous studies using the animal experimentation paradigm examined the behavior of animals as they coped with environmentally induced aversive conditions such as extreme temperature, electrical shock or loud noises (Lazarus & Folkman, 1984). Missing from this approach however, was a recognition of the cognitive-emotional component of behavior that more recent research validates as being as an integral aspect of human behavior (Houston, 1987; Lazarus & Folkman, 1984).

The psychoanalytic ego model is another perspective that has been used to explain coping. In contrast to the animal experimentation model of coping which gave primary emphasis to behavior, the psychoanalytic ego model assigns primary importance to the role of cognitions. In this research coping was conceptualized as a defense mechanism (Finch, 1993). These defense mechanisms could be organized into a hierarchy that progressed from immature to mature mechanisms (Endler & Parker, 1990). A weakness of the psychoanalytic ego model is that coping is viewed as an unconscious personality style (e.g., obsessive-compulsive, repressor) not amenable to change (Endler & Parker, 1990; Finch, 1993). Similar to the animal experimentation model, the psychoanalytic ego model has largely been supplanted by theoretical perspectives that take into account the complexity of human behavior (Folkman & Lazarus, 1988).

The work of Lazarus and Folkman (Lazarus & Folkman, 1984) has had considerable influence in terms of current conceptualizations of coping and it is their definition of coping that will be adopted for the present discussion. According to Folkman and Lazarus, coping is defined as “constantly changing cognitive and behavioral efforts to manage specific external and/or internal demands that are appraised as taxing or exceeding the resources of the person” (p. 141). Stated differently, coping is a regulatory operation representing efforts to maintain a desirable level of personal functioning in the face of demands on one’s resources (Folkman & Lazarus, 1985). This view of coping encompasses three important features.

First, coping is defined *without reference to its outcome*. Thus, coping refers only to the efforts to manage a stressor, not the extent to which these

efforts are successful. This approach is different than that which is used in animal models of coping in which coping is defined in terms of how successful individuals were in altering the outcome (Folkman, Chesney, McKusick, Ironson, Johnson & Coates, 1991). A problem associated with outcome based models of coping is that they imply that mastery can be achieved over any type of stressor. In reality, however, people are often confronted with situations which cannot be mastered (e.g., natural disasters) or occur repeatedly. In these instances, effective coping involves coming to terms with the undesirable outcome as opposed to mastering them.

Second, coping is *process-oriented*. Coping refers to what individuals *actually* do or think and changes in these behaviors or thoughts may occur as a situation unfolds.

Third, this definition is *contextual*. Coping refers to what individuals actually do or think *within a specific context*. Therefore, coping is not solely determined by dispositional tendencies but individuals' appraisals of the demands of a given situation. This contextual approach emphasizes specific stressful situations as compared to general stressful conditions. It is argued that the complexity and ambiguity of general stressful situations makes it difficult to ascertain what precisely individuals are coping with (Folkman et al., 1991). For instance, it is more difficult to respond to the question "How do you cope with your stressful job?" which refers to a general condition, than to the question, "What did you do to cope when you did not receive a paycheck last week?", which refers to a specific stressful condition.

Conceptual Issues Related to Coping

There are two issues that have been central to much of the coping literature. First, an issue that has been discussed considerably has to do with the stability of coping strategies over time. The second issue concerns the types of coping strategies that individuals employ when faced with a stressor. While it is generally acknowledged that individuals may utilize numerous coping strategies, researchers have debated whether the type of strategies that are used can be grouped in conceptually meaningful ways. Given the importance of these two issues in the coping literature they will each be explored in greater detail in the following sections.

Dispositional versus Process-Oriented Approaches to Coping. An issue that has been discussed at length in the coping literature is whether individuals have a coping style or disposition. Carver, Scheier, and Weintraub (1989) have contended that “people do not approach each coping context anew, but rather bring to bear a preferred set of coping strategies that remains relatively fixed across time and circumstances” (p. 270). Although it is not always explicitly stated many researchers who investigate relationships between coping and other psychological health variables have implicitly assumed such a style exists across situations (Bouffard & Crocker, 1992).

Other researchers have rejected the view of coping dispositions and have asserted that coping is at least partially dependent upon the context. Thus, coping is seen as a dynamic process influenced by the cognitive appraisal of the situation, coping options, and the availability of coping resources (Lazarus & Folkman, 1984). Evidence for this dynamic view of

coping has been presented from a number of areas. Lazarus and Folkman (1980) found that stress in work place settings was associated with the greater use of problem-focused strategies, whereas in dealing with health related problems individuals were more likely to rely on emotion-focused strategies. More recently, Bouffard and Crocker (1992) examined coping strategies used over a 6 month time period by individuals with physical disabilities. Their analyses indicated that the person-by-situation interaction accounted for more variance in coping than when only the person *or* the situation was considered. Thus, these results provided support for the process oriented view of coping rather than the dispositional perspective.

In summary, a growing body of evidence suggests that coping strategies are not entirely dictated by personal styles but also influenced by situational factors. Thus, an interactional perspective is thought to yield the most information about the use of coping strategies. Ironically, however, the most frequently used way to examine coping strategies is through research designs that do not permit the dynamic nature of coping to be well explored. Folkman and Lazarus (1985) have noted one criteria for adopting a process-oriented model of coping is that repeated measures of coping must be made. By taking multiple measures of coping during stressful encounters changes in coping can be examined.

Types of Coping. Although a number of taxonomies have been used to describe the various types of coping strategies (Billings & Moos, 1981; Carver et al., 1989) the taxonomy developed by Lazarus and Folkman (1984) has been the most widely used. According to Lazarus and Folkman, coping

has two major functions: (1) to manage or alter the problem that constitutes the source of distress or, (2) to regulate the mood responses to the stressor.

Problem-focused coping refers to attempts aimed at managing or altering the problem and includes strategies such as cognitive problem-solving, decision making, interpersonal conflict resolution, information gathering, advice seeking, time management, and goal setting. In addition, problem-focused coping can include behaviors such as joining a weight control program, following a medical treatment plan, fixing a broken part, or allowing more time to travel from one place to another (Folkman et al., 1991). In contrast, emotion-focused coping strategies attempt to regulate individuals' emotional responses to stressors. This approach to coping includes cognitive efforts that change the meaning of the situation without changing the environment through the use of techniques such as cognitive restructuring, social comparisons, minimization, or positive reappraisal; behavioral attempts to make one feel better, through the use of relaxation, meditation, support groups, religion, humor, and efforts to escape through the use of drugs or alcohol (Folkman et al., 1991).

Why might individuals rely more on emotion-focused coping in one situation more than problem-focused coping or vice versa? One of the most distinct situational characteristics thought to influence the choice of strategy has to do with the perceived changeability of the stressor(s) (Folkman et al., 1991). In general, in situations where the demands are appraised as being amenable to change or manipulation, individuals tend to make greater use of problem-focused coping. Alternatively, in situations in which the demands are appraised as being resistant to change,

individuals tend to make greater use of emotion-focused coping. Thus, the typical pattern is that both forms of coping are used during a stressful encounter, with the proportion of emotion-focused versus problem-focused coping changing depending on the perceived changeability of the outcome (Folkman et al., 1991). The match between problem-focused coping and the appraisal of events being controllable and emotion-focused coping and the appraisal of events being uncontrollable has been termed the “goodness of fit” between strategies and situations.

A poor fit between the situational appraisal of changeability and the actual coping strategy used is thought to lead to increased distress. By continuing to use problem-focused coping in situations that are not controllable, a person remains in a frustrating situation—which is likely to result in increased distress. Collins, Baum, and Singer (1983) evaluated the use of problem-focused and emotion-focused coping in residents of Three Mile Island following the nuclear reaction there (an uncontrollable event). A positive relationship was found between the use of problem-focused coping and psychological distress symptoms. Similarly, Forsythe and Compas (1987) found that the levels of psychological symptomatology varied as a function of the appraisal of control and coping with life events among college students. More specifically, the use of relatively more problem-focused coping efforts was associated with lower levels of psychological distress when events were appraised as controllable. However, these same coping strategies were associated with increased levels of psychological distress when used to deal with events over which individuals perceived they had little control. Thus, it appears that the role of coping in the stress

process varies as a function of the appraisal of event controllability (Valentiner, Holahan & Moos, 1994).

Although the problem-focus versus emotion-focus coping and the accompanying goodness-of-fit taxonomy has been the focal point of considerable research in the coping literature, this taxonomy has been criticized as overly simplistic (Carver et al., 1989; Endler & Parker, 1990; Endler, Parker, & Summerfeldt, 1993; Gould, Finch, & Jackson, 1993). For instance, Gould and colleagues (Gould, Eklund, & Jackson, 1993; Gould et al., 1993) conducted two recent qualitative analyses of coping strategies used by elite athletes. These investigators found that athletes used a variety of coping responses which did not appear to fit neatly into the problem-versus emotion focused coping dichotomy suggested by Lazarus and Folkman (1984). Rather some coping strategies could be classified as *both* problem- and emotion-focused strategies.

In an effort to address the limitations posed by the problem- versus emotion-focused coping strategy dichotomy Endler and colleagues (1993) have suggested that coping consists of four dimensions rather than two as suggested by Lazarus and Folkman (1984). More specifically, Endler and colleagues propose that individuals respond to stressors by employing *instrumental, distraction, palliative, and negative emotion* coping strategies.

Instrumental coping attempts to alleviate the source of stress or discomfort. This dimension is not unlike the problem-focused coping dimension that has been identified by Folkman and Lazarus (1985;1988). *Distraction* coping refers to individuals' attempts to cope with a stressor by

thinking about other things, engaging in unrelated activities, or seeking out the company of others. Distraction coping is conceptually similar to what has been termed by other researchers as “avoidance coping” (Billings & Moos, 1981). The use of avoidance coping has been linked to a variety of negative health outcomes (Endler & Parker, 1990; Endler et al., 1993).

Palliative coping involves a variety of self-help activities and responses that are employed in an attempt to alleviate the unpleasantness of a health problem (Endler et al., 1993). More specifically, these attempts at self-care may involve activities such as getting adequate sleep, conserving energy, and attempting to improve the quality of one’s environment (Endler, Parker & Summerfeldt, in press). Finally, *negative emotion* coping involves a preoccupation with the emotional consequences of a health stressor.

It seems appropriate to briefly discuss the contribution of Endler and colleagues in relation to the existing conceptualizations of coping. First, it can be noted that the dimensions suggested by Endler and colleagues do not appear to be entirely unique from the problem- versus-emotion dichotomy forwarded by Lazarus and Folkman (1984). For example, as noted earlier, Endler and colleagues have indicated that what they have termed “instrumental coping” is conceptually similar to what is termed elsewhere in the coping literature as “problem-focused” coping. Thus, this component of the work of Endler and colleagues is not new. However, the addition of “distraction” as a coping dimension appears to be an element that does not fit within the Lazarus and Folkman problem-versus-emotion focused coping dichotomy and which tacit knowledge suggests is a salient coping strategy used by individuals to cope with stress. Finally, although the

“negative emotion” and “palliative” dimensions forwarded by Endler and colleagues, bears some conceptual similarity to the emotion-focused coping suggested by Lazarus and Folkman (1984), they seem to represent finer distinctions of the way that emotion-focused coping can be used (e.g., being preoccupied with a health problem is more characteristic of negative emotion coping; whereas attempting to alleviate the response to a health problem is more congruent with palliative coping). Thus, the efforts of Endler and colleagues appear to build upon the previous coping literature yet provide a more precise means of thinking about the strategies individuals use to cope with health difficulties.

To conclude, the way in which coping has been conceptualized and defined has varied considerably. Not surprisingly, the way that coping has been defined has had implications on the way that coping has been measured. Therefore, in the following section, the measurement of coping will be discussed.

Measurement of Coping

The coping literature is replete with various coping assessments. The intent of this discussion will not be to provide an exhaustive discussion of the available coping inventories. Instead, the goal will be to briefly discuss the dominant inventories that have been developed. Not surprisingly, the divergent theoretical assumptions regarding various aspects of coping (e.g., dispositional vs. dynamic view) have been reflected in the myriad of assessments that have been developed.

Carver and colleagues (1989) have developed a self-report coping inventory that is referred to simply as the COPE. A strength of the COPE is

that it has been subjected to rigorous psychometric testing and appears to have a stable 13-factor solution. However, it should be recognized that the COPE has been developed based on the theoretical supposition that individuals possess certain coping styles or dispositions. Thus, it has been suggested that the COPE is best thought of as a *interindividual* measure of coping (Endler et al., 1993) and may be most appropriate for use when attempting to compare coping responses between individuals.

Folkman and Lazarus (1988) have developed one of the most widely used coping assessments, the Ways of Coping Questionnaire (WCQ). In contrast to the COPE, the WCQ has been developed based on the theoretical assumption that coping is a dynamic process rather than a stable disposition and for this reason has been referred to as an intraindividual measure of coping (Endler et al., 1993). The WCQ (1988) has undergone revision from a yes/no checklist to a 4-point Likert scale format and currently includes eight subscales. The eight subscales include: confrontive coping, distancing, self-control, accepting responsibility, escape-avoidance, planful problem solving, and positive reappraisal. It is significant that these eight scales are different from those reported previously by Folkman and Lazarus (1985). Thus, an apparent limitation of the WCQ is the instability of the factors (Endler & Parker, 1990).

Due to problems associated with the instability of the factors on the WCQ, Tennen and Herzberger (1985) suggest that investigators using the WCQ conduct a factor analysis with their sample and use the results to determine subscales for the coping items. While the prudence of such a suggestion is not disputed, this suggestion assumes that every investigation

has a sample size large enough to permit a factor analysis to be conducted. However, such a suggestion may not be realistic when working with a relatively specific population (e.g., injured athletes who have all experienced the same type of injury).

Additional problematic aspects of the WCQ have been noted when attempting to use it with specific populations. The WCQ was developed to assess individuals' responses to a broad range of possible stressful situations (Endler et al., 1993). A limitation of this approach is that, in many instances the research question is focused on how a sample of individuals cope with *specific* stressors. To draw a parallel it can be noted that within the realm of sport psychology, sport specific measures of anxiety (e.g., CSAI-2) have generally proven to be more useful in predicting competitive anxiety than measures of general anxiety (Martens, Vealey, & Burton, 1990). Similarly, it has been argued that measurement of the coping strategies used by individuals coping with health problems is best measured by inventories that address the specific stressors and coping strategies relevant to these populations (Endler et al., 1993). As Pearlin (1991) has commented:

The ability of coping to explain outcome variability is best demonstrated when this variability is related to the ways people cope with identical stressors...It is not easy to construct new measures of coping for each life problem or stressor we study, but it may be necessary if we are to get a clear fix on the effects of coping. Standard measures of coping, when applied to unstandard vicissitudes, may be of limited utility (p. 268).

Given the above mentioned limitations of the WCQ, it is somewhat surprising that the WCQ has achieved such widespread acceptance. Endler and Parker (1990) have noted that, although the WCQ has had an important theoretical impact, it has probably been used more frequently by researchers than the psychometric properties of the scale would warrant.

In response to the limitations posed by the use of *general* measures of coping to assess coping strategies for dealing with *specific* stressors (e.g., health problems), a variety of more specific coping assessments were developed during the 1980s and early 1990s (Endler & Parker, 1990). Unfortunately, some of these more recently developed health coping assessments have become so “customized” that it has become difficult to generalize the results from one health problem or population to another. For instance, McCubbin, McCubbin, Patterson, Lauble, Wilson, and Warwick (1983) developed a scale that measures the coping behaviors of parents whose children have cystic fibrosis. While the assessment developed by McCubbin and colleagues may provide useful information on coping that is highly relevant for parents of children with cystic fibrosis, this information may only be relevant to parents faced with these or very similar stressors. Another drawback of assessments developed with very narrowly defined populations is that they are often based on inadequate sample sizes which increases the chances of producing unstable factor solutions.

In short, the challenge for developers of coping assessments is to strike a balance between developing instruments that are specific enough to retain their relevance for the population of interest, yet not so specific that

they can only be used with very narrowly defined populations. In an attempt to strike this type of balance Endler and associates (1993) have developed the Coping with Health and Injury Problems (CHIP) scale.

The CHIP was developed as a coping measure that could be used with a populations experiencing a diverse array of health problems. In addition, consistent with the theoretical perspective of Folkman and Lazarus (1985) which maintains that coping is a process subject to personal *and* situational influences, the CHIP was designed to examine changes in coping responses during the course of a particular health problem. The four factors of the CHIP include: *instrumental*, *negative emotion*, *distraction*, and *palliative* coping. Because the conceptual underpinnings of these factors were described previously, they will not be detailed here.

Two aspects of the CHIP appear to contribute to its usefulness in assessing the coping strategies used by injured athletes during the course of their recovery. First, the CHIP was developed to examine changes in individuals' coping responses over time (Endler et al., 1993); thus, this assessment appears to be well suited for investigations adopting a process-orientation of coping. In addition, because the CHIP is an assessment that has been specifically developed for use with populations experiencing physical and health related problems, it is considered especially relevant for examining the coping responses of injured athletes.

The preceding discussion noted the significant advancements and recurring debates that have occurred with respect to the assessment of coping. In summary, it is now possible and often appropriate to measure coping as it relates to specific stressors (e.g., injuries). However, in addition

to the measurement issues related to coping, some researchers have been concerned with the practical implications of using certain coping strategies. In particular, investigators have forwarded the notion that some forms of coping may be more advantageous, effective, and/or adaptive ways of coping. The plausibility of these notions will be explored in the following section.

Relationship Between Coping, Adherence, and Recovery

The notion that problem-focused coping is more effective in recovery from athletic injuries is an idea that has echoed in the sport science literature (Silva & Hardy, 1991; Smith et al., 1990; Weiss & Troxel, 1986). Silva and Hardy (1991) and Weiss and Troxel (1986) have speculated that coping with injuries is a process of athletes regaining of emotional control which in turn leads to a task-focused, active coping approach. However, it must be underscored that the above mentioned recommendations are based on their intuitive appeal rather than being empirically derived.

Outside of the sport science research it can be observed that despite the vastness of the coping literature, few researchers have evaluated the effectiveness of different types of coping strategies. However, as Pearlin (1991) has noted, from a practical perspective, it is necessary to have a better understanding of whether certain types of coping are effective i.e., we know little about if and how coping makes a difference in people's lives.

Recently, a limited number of studies have begun to examine the effectiveness of coping interventions with individuals exposed to medical and surgical stressors (Folkman et al., 1991; Martelli, Auerbach, Alexander, & Mercuri, 1987). In an intervention study by Martelli and

colleagues (1987) patients undergoing oral surgery were presented with either a problem-focused, emotion-focused, or mixed-focused stress management intervention. The mixed-focus intervention produced the best overall response to surgery, while the emotion-focused intervention resulted in the poorest post-surgery adjustment levels. The investigators noted that the nature of the stressor in this case (oral surgery) was one that would not require a response that was dominated by either problem-focused (e.g., imminent tornado) or emotion-focused (e.g., imminent death from illness) coping. Thus, the finding that the mixed-focus intervention was most effective was expected.

In addition, to the issue of controllability of a stressor it has been suggested that the temporal relationship between the individual and the stressor influences the effectiveness of a given coping strategy (Auerbach, 1986). There are indications that emotion-focused strategies may be more valuable in the early stages of coping, whereas problem-focused coping may be advantageous in the latter stages and for influencing long-term health outcomes (Lazarus & Folkman, 1984).

Conclusions Regarding Coping Research

The recent coping literature has witnessed several advances that have implications for current research. First, recent evidence suggests that the coping styles used by individuals are not entirely dispositionally determined but are influenced by situational characteristics (e.g., the controllability of the stressor). Second, recent theorizing indicates that the coping strategies that individuals use may not always be amenable to classification as problem-focused or emotion-focused as has often been

assumed. Third, advancements in the measurement of coping indicate it is not only possible but desirable to measure coping using assessments that have been developed to assess coping strategies used to deal with relatively specific stressors. Interestingly, despite all of these improvements in coping theory and measurement, little is known about how injured athletes cope with injuries over the course of their rehabilitation and if the use of certain coping strategies is more advantageous with regard to injury rehabilitation and recovery. It is suggested that research in this area is sorely needed.

Social Support

In the last two decades a growing body of literature in diverse fields such as behavioral medicine, public health, health psychology and nursing has consistently, although not invariably, linked social support to adherence to a variety of health regimes and positive health outcomes (Meichenbaum & Turk, 1987; Wankel, 1984; Wankel, 1985; Willis & Campbell, 1992). Because much of the social support literature has been embedded within a stress and coping paradigm (Cohen & Wills, 1985) it is relevant to return to the injury response model presented earlier (see Figure 1). It can be recalled that, according to injury response model presented, social support can be viewed as a resource that may function in one of two ways. First, social support may intervene between the stressful event and the cognitive appraisal of the event as stressful. Alternatively, social support may play a role in the type of coping strategy used to cope with an event.

That social support would be linked to positive health outcomes is in part due to a recognition that health behaviors are not just a function of the individual and that behavior cannot be understood in a vacuum. In general, people have difficulty changing a behavior or initiating a behavior if there is not concomitant support from the environment (McLeroy, Bibeau, Steckler, & Glanz, 1988; Zimmerman & Connor, 1989). In short, because much of our identity and behavior is socially defined and reinforced, there is a need to examine the role of the social environment when considering health outcomes such as adherence and recovery.

In this section the relevance of social support as it relates to athletic injury rehabilitation adherence and recovery will be explored as follows. First, a working definition of social support will be provided. Second, methodological and conceptual issues related to the measurement of social support will be discussed. Finally, research that has examined the of role social support as it relates to adherence and recovery will be examined.

Defining Social Support

Historically, the social support literature has been plagued by a lack of consensus on exactly how social support should be defined (Hardy & Crace, 1993; Israel, 1982). Durkheim (1952) is often credited with providing the first empirical work in the area of social support. In his seminal work examining suicide rates, Durkheim found suicides were more common among individuals with few social ties. According to Durkheim, the loss of social ties or *anomie* was contrary to psychological well being. Durkheim's work served as a catalyst for subsequent research on social ties and "social support." However, following Durkheim's lead early researchers tended to

conceptualize social support rather simplistically with social support merely defined as the number of friendships, close relatives or organizational involvements (Hardy & Crace, 1993). More recently, research has indicated that it is the *functional* nature of social relationships (i.e., the quality or type of social interactions) that is a more salient component of social support than the sheer *number* of providers (Israel & Schurman, 1990).

Another advance in the social support literature has been the recognition of the multidimensional nature of social support (Israel & Schurman, 1990). Weiss (1974) was one of the original researchers to recognize social support as a multidimensional construct. Weiss viewed social support as consisting of six dimensions: intimacy, social integration, nurturance, worth, alliance, and guidance. While more recent typologies describing the dimensions of social support have been forwarded (Billings & Moos, 1981; Cohen & Wills, 1985), for the present discussion it is important simply to acknowledge that current conceptualizations of social support widely recognize it as a multifaceted construct.

In summary, the social support literature has witnessed two major advances. First, most current social support theorists agree that social support is more related to the *quality* of support that is provided than the *quantity*. Second, it is now currently recognized that social support is multifaceted construct. However, despite the consensus in these two areas, social support continues to be variously defined. For purposes of this discussion Shumaker and Brownell's (1984) definition of social support will be adopted. Accordingly social support is defined as "an exchange of

resources between at least two individuals perceived by the provider or the recipient to be intended to enhance the well-being of the recipient” (Shumaker & Brownell, 1984, p. 13). Several implications follow from this definition of social support.

First, it can be noted that the mere *provision* of social support does not necessarily constitute social support as it must be *perceived* by individual’s as being intended to enhance the recipient’s well being. Shinn, Lehmann, and Wong (1984) have noted that a weakness of much of the social support research is that it has not made clear distinctions between “social interaction” and “social support.” For instance, a recent study examining the influence of spousal support on recovery rates from coronary bypass measured social support via the number of hospital visits made by a spouse following surgery (Kulik & Mahler, 1989). However, this type of approach does not tap into the perceptions of the recipient (the patient) and is perhaps more accurately considered a study on the influence of social interaction on recovery rates following surgery.

Related to above, a second implication that follows from this definition is that, because social support involves an “exchange” of resources between a recipients and providers, incongruencies may exist between the needs of recipients and what is being made available by providers (Shumaker & Brownell, 1984). People usually have specific ideas on when it is appropriate to help another person and how this assistance should be provided. When providers and recipients of social support differ in their ideas on how and when this support should be provided, recipients are unlikely to feel that they received what was needed. For instance, the

bereaved are frequently the recipients of well meaning, but inappropriate comments from friends and relatives attempting to assist them in coping with the loss of a loved one. Examples of such comments include statements such “don’t take it so hard” or “he/she is better off now” (Shumaker & Brownell, 1984). Similarly, injured athletes may experience distress when others around them remark, “you will be fine”, “now you will have time for other things”. These types of responses often have the effect of increasing the intensity of pain of those who are grieving the loss of another individual or the loss of their own health. While these types of statements are typically well intentioned, they illustrate the incongruities that may occur in the social support exchange process and the difficulty social support providers may have in knowing how to be supportive (Shumaker & Brownell, 1984).

Incongruities in the exchange process between recipients and providers of social support may occur in other ways. In some cases individuals may not feel the need to seek social support when dealing with situations that many other individuals perceive to be stressful. For these individuals the benefits that are typically associated with receiving social support may not be applicable. Wilcox and colleagues (1994) found that among older adults recovering from physical disabilities, those who reported no need for social support had similar recovery rates as those who reported high levels of social support. The investigators speculated that those who perceive no need for social support may have well developed habits of independence that were able to be maintained despite health problems. To conclude, in order to understand the subtleties of social

support it is imperative to assess the perceived adequacy of the social support.

Measurement of Social Support

As noted previously, a defining characteristic of the social support literature has been the lack of consensus over how social support should be defined. Thus, it is not surprising that there has been considerable diversity in the way that social support has been measured (Hardy & Crace, 1993). Additionally, as noted by Sarason, Sarason and Pierce (1990) although social support measures have “multiplied like rabbits” the psychometric soundness of many of these measures has not been convincingly demonstrated. Two social supports assessments that have been widely used and appear to be psychometrically sound are the Social Support Questionnaire (SSQ) (Sarason, Levine, Basham & Sarason, 1983) and the Social Support Inventory (SSI) (Brown, Alpert, Lent, Hunt, & Brady, 1988; Brown, Brady, Lent, Wolfert, & Hall, 1987).

According to the developers of the SSQ, social support encompasses two basic elements: (1) a perception that there is a sufficient number of available others to whom one can turn in times of need, and (2) a degree of satisfaction with the available support. To assess the dimension of perceived availability individuals are asked questions such as the following: “Whom can you really count on to listen to you when you need to talk”? “Whom can you count on to console you when you are very upset”? Respondents list the number of persons who fill these functions (N). Additionally, respondents rate the degree to which they are satisfied with the support that is provided on a Likert scale ranging from 1 (“very

satisfied”) to 7 (“very unsatisfied”). An overall score is obtained by dividing the sum of all N and S scores by the number of items on the scale (twenty seven).

A strength of the SSQ is that it taps individuals’ perception of the adequacy of their support—a component that has been identified as being important in social support measurement. However, as Tardy (1985) has noted, the SSQ is probably best thought of as a measure of emotional support (e.g., who can you really count on to console you when you are really upset?) rather than one that taps instrumental or tangible forms of social support (e.g., who can provide me with information on financial assistance?). Thus, while the SSQ is a widely used measure of social support that has been psychometrically validated (Sarason et al., 1983), its unidimensional nature appears to be problematic in light of the research supporting the multidimensionality of social support (Israel & Schurman, 1990).

The multidimensional nature of social support appears to be more adequately assessed through another widely used social support self-report assessment, the SSI. Previous factor analysis on the SSI has produced a five-factor solution which consists of: (1) acceptance and belonging, (2) appraisal and coping assistance, (3) behavioral and cognitive guidance, (4) tangible assistance and material aid, and (5) modeling. Similar to the SSQ, a basic theoretical tenet of the SSI is that social support needs to be measured in terms of its perceived adequacy by the recipient.

Conceptual Issues Related to Measurement of Social Support

The preceding discussion has focused on specific self-report scales that have been used to assess social support. However, before concluding

this section on measurement it seems pertinent to discuss a related issue. This issue is not limited to any particular assessment of social support but has to do with an underlying assumption regarding the measurement of social support. More specifically, a notion that has permeated the social support literature (like the coping literature) is the idea that social support is a stable, trait-like entity (Wilcox et al., 1994). The typical research design measures social support as an independent variable at the outset of a study and then compares this to a outcome measure such as adherence or recovery. Thus, it is assumed that social support remains stable over time. However, recently it has been suggested that for a variety of reasons it may be more appropriate to view social support (similar to coping) as a *process* that is susceptible to situational influences (Wilcox et al., 1994).

As Wilcox and colleagues (1994) have noted individuals experiencing stress from injuries or illness may have higher needs for social support—a need that is generated by increased dependence. Alternatively, providers of social support may begin to experience “resource bankruptcy” if they feel unable to provide social support at the levels desired by recipients (Hardy & Crace, 1993). Over time these feelings of resource bankruptcy may cause providers of social support to begin to withdraw support in an effort avoid becoming emotionally exhausted.

Recent evidence suggests that injuries and illnesses may result in the degradation of social resources, especially when the injury or illness is prolonged (Dunkel-Schetter & Bennett, 1990; Wilcox et al., 1994). In a sample of older adults who were hospitalized for severe injuries and illnesses Wilcox and colleagues (1994) found social support levels changed

over the course of patients' recovery. Patients were asked whether they had "someone to count on" at three times: prehospitalization, 6 weeks following their injury and 6 months following their injury. The percentage of individuals who reported they had "someone to count on" changed from 73%, to 66.2% to 62% at each of the respective time intervals.

Correspondingly, the number of individuals who reported they had "no one to count on" changed from 14.2%, to 25% to 30% over the same time periods. These results suggest that a severe injury may serve as catalyst for the degradation of social resources (Wilcox et al., 1994). However the dynamic nature of social support is likely to be obscured unless social support is viewed and measured as a process.

Relationship Between Social Support, Adherence, and Recovery

As noted previously, research from medical and health fields suggests that social support fosters adherence to regimes such as weight reduction, smoking cessation, alcoholism treatment, taking hypertension medication, seat belt use, and dietary changes in diabetics (Meichenbaum & Turk, 1987; Morisky, DeMuth, Field-Fass, Green, & Levine, 1985). This portion of the discussion will review the social support literature with a special emphasis on how it relates to injury rehabilitation adherence. However, it must be noted that the relationship between social support and adherence as it relates specifically to the rehabilitation of sport injuries has not been extensively examined. Therefore, this section will begin by discussing analog research that has examined compliance in exercise and cardiac rehabilitation settings. It is thought that findings from these two areas may have some relevance to the athletic rehabilitation settings,

although for the reasons that will be discussed presently, there may be limits on the degree to which the exercise adherence and cardiac rehabilitation research can be applied to athletic injury settings.

Exercise Adherence Research. Although the physical benefits of participating in a regular exercise program are impressive and have been firmly substantiated, the drop out rates associated with exercise programs are decidedly dismal (McAuley, 1992). It has been repeatedly documented that approximately 50% of the individuals who initiate exercise programs do not continue after the first 6 months (Dishman, 1988). Interestingly, one of the most consistent findings among individuals who *do* exercise is that they prefer to exercise with at least one other individual (Willis & Campbell, 1992). It seems that the majority of individuals find exercising with someone else provides them with a sense of support and commitment that is not available when they are alone. Despite the seemingly facilitative role social support seems to have in influencing exercise adherence, few studies have examined the role of social support in regard to exercise adherence. This may be because the exercise literature has been dominated by intrapersonal explanations for exercise behavior (e.g., self-efficacy theory). One study that has examined the link between exercise adherence and social support is the work of Wankel (1985).

In a study of adult university employees Wankel (1985) used a discriminant function analysis to compare exercise adherers to nonadherers. On the 9 variables used in this analysis (friendship within the program, encouragement from work supervisor, change in feeling of psychological well-being, encouragement from nonwork friends,

encouragement from nonwork friends, relief of tension, prevention of cardiovascular disease, release of competitive drive, and to satisfy curiosity about the program) it was found that the variables that contributed the most to difference between adherers and nonadherers were the amount of encouragement perceived from work supervisors to exercise and the perceived support received from friends within the program. These findings underscore the importance of considering social influences when examining adherence patterns.

Cardiac Rehabilitation Adherence Research. When the role of social support has been examined in cardiac rehabilitation settings, it is most often examined in light of the role spouses and significant others play in providing support (Willis & Campbell, 1992). For instance, the Ontario Exercise-Heart Collaborative Study (OEHCS) was a longitudinal study of adherence patterns among cardiac rehabilitation patients from several rehabilitation centers. The analysis from this study indicated that male patients whose wives were indifferent or negative toward their exercise program were three times more likely to drop out (Oldridge, 1984). Moreover, it was found that among a variety of physiologic, demographic, and psychological variables that were included as possible factors related to adherence, lack of spousal support was the most prominent factor that predicted drop out among patients (Oldridge, 1984). Thus, it would appear that among cardiac patients, the presence of spousal support is an important variable to consider when examining adherence. However, a question that remained unanswered by this OEHCS research is *why* social support enhances adherence. In other words, what are the mechanisms by

which social support enhances adherence. As a follow-up to the OEHCS, Erling and Oldridge (1985) explored the possible mechanisms underlying the apparently facilitative effects of social support.

The follow-up study conducted by Erling and Oldridge was an intervention study in which the primary objective was to educate spouses about all facets of the cardiac rehabilitation exercise program. It was thought that educating spouses would lessen potential conflict between spouses regarding the nature of the exercise program and thereby indirectly influence adherence. The effectiveness of the intervention was evaluated in terms of drop out rates and changes in spouses' attitudes. Prior to the spousal support intervention, the drop out rate was 56% with 47% of the spouses indicating they were anxious about their husband's ability to exercise. Following the intervention, the drop out rate was reduced to 10% and only 15% of the spouses indicated they were concerned about their husbands ability to exercise. Thus, the results of the intervention study suggest that social support enhances adherence because it results in a greater concordance between spouses regarding the various expectations and safety of the exercise programs. Moreover, the fact that spousal support levels were amenable to being changed through an intervention provides further evidence against viewing social support as a static characteristic that remains unchanged across time.

In conclusion, looking across both the exercise adherence and the cardiac rehabilitation literature it is suggested that the presence of social support enhances adherence to health regimes. The limitations associated with generalizing the results from the cardiac rehabilitation and exercise

adherence literature to injury rehabilitation settings will be discussed in the following section.

Problems with Generalizability. A number of problems are associated with generalizing the finding from cardiac rehabilitation and exercise adherence studies conducted to injured athlete populations. First, in the cardiac rehabilitation literature, the majority of studies have used participant pools that have consisted almost entirely of males, usually over the age of 45, who have suffered from heart attacks. In contrast, the average age of injured athletes may be significantly lower than that found in cardiac rehabilitation settings and because of changing cultural norms regarding health and fitness, these two populations may have differing perceptions, beliefs, and motivational orientations regarding health and fitness behaviors.

In addition, many of the studies conducted in cardiac rehabilitation settings have examined social support in terms of the role of spousal support. However, spousal support may not even be a salient variable when considering the social support systems of many injured athletes. Finally, the spousal support perspective that is used in the cardiac rehabilitation literature may tell us how a primarily male population reacts to support from significant others, but given that populations of injured athletes tend to consist of at least as many females as males, the cardiac rehabilitation literature may have limited applicability.

Similarly, extrapolating findings from the exercise adherence literature regarding the role of social support to rehabilitation settings may also be problematic. Exercise adherence is often studied in the context of

work-site settings. Again, the population found in work-site settings may be older and of different motivational orientations than would be found among injured athlete populations.

For these reasons it would appear to be beneficial to develop a body of knowledge about the functional nature of social support as it relates to injured athletes. This body of knowledge would take into account the *specific* contextual factors injured athletes encounter that are different from those faced by cardiac patients or exercise participants.

Unfortunately, such a well developed body of knowledge does not yet exist. To date the only known work in this area has been conducted by Fisher and colleagues (1988) and Duda and colleagues (1989).

Injury Rehabilitation Adherence Research. Fisher and associates (1988) investigated psychosocial factors related to adherence by comparing injured athletes who adhered to their rehabilitation programs following an athletic injury and those who did not adhere. Participants were retrospectively assessed through a 40-item self-report inventory, the Rehabilitation Adherence Questionnaire (RAQ), which contains six subscales. The subscales of the RAQ include: perceived exertion, pain tolerance, self-motivation, support from significant others (e.g., sports medicine staff, teammates) scheduling, and environmental conditions. Participants' responses were then compared to adherence records provided by the trainers in charge of their program. Discriminant function analysis revealed that support from significant others contributed the most to the differentiation between adherers and nonadherers. Thus, injured athletes who received support from sports medicine providers and teammates were

more likely to adhere to their rehabilitation programs than athletes who perceived less support.

The work of Fisher and associates (1988) is important because it is the first study to attempt to link psychosocial factors to injury rehabilitation adherence. However, a limitation of this investigation is that the authors provided no details on the psychometric qualities of the RAQ. Subsequent work by Brewer and colleagues (Brewer, Daly, Van Raalte, & Petitpas, 1994) examining the validity and reliability of the RAQ indicated that test-retest reliability coefficients for the RAQ subscales ranged from .27 to .87. Alpha coefficients for the RAQ subscales were all lower than .61 at Week 1 and ranged from -.23 to .84 at Week 2. Finally, RAQ subscales were not strongly correlated with adherence measures. Clearly, further refinement and validation of the RAQ are needed before being used by investigators. Therefore, given the apparent psychometric qualities of the RAQ and the fact that the RAQ was used by Fisher and colleagues (1988) to investigate adherence rates among injured athletes, it would seem that one should remain tentative about drawing conclusions from the Fisher et al. investigation.

Duda and her colleagues (1989) examined predictors of adherence among injured collegiate athletes using the conceptual framework of personal investment theory. It was demonstrated that athletes who displayed higher compliance were more likely to perceive social support for their rehabilitation, believe in the efficacy of their treatment, report higher levels of self-motivation, and adopt a mastery or goal orientation toward sport participation.

An interesting aspect of the study by Duda and colleagues was the way in which social support was measured. An issue that has been identified in the literature concerns whether social support for a specific health problem is more highly related to outcome measures such as adherence than is general social support (Connell, Davis, Gallant, & Sharpe, 1994). In recognition of this issue Duda and colleagues measured social support in two ways. First, support was measured as general social support provided by parents, family members and friends for *athletic* participation (6 items). Additionally, support was assessed as support that was provided by coaches, teammates, and athletic trainers specifically for *rehabilitation* participation (3 items). Athletes' social support for rehabilitation participation was a better predictor of adherence than social support for athletic participation. Unfortunately, the psychometric details of the social support assessments used in this study were not provided by the investigators.

Conclusions Regarding Social Support

This section has reviewed definitional and measurement issues related to social support and the research which has examined the role of social support. Taken as whole what types of conclusions can be drawn? First, in terms of measurement of social support, social support self-report inventories should take into account two components of social support: (1) its multidimensionality, and (2) the need for support to be assessed in terms of its perceived adequacy from the recipient's perspective. With regard to the research that has linked social support to adherence, it appears that social support plays an important role in increasing adherence to a variety

of different types of regimens. The work of Fisher et al. (1988) and Duda et al. (1989) have been instrumental in stimulating research that examines social support as a predictor of athletic injury rehabilitation adherence. However, because of the psychometric limitations of the assessments used in each of these studies, one must remain cautious about drawing conclusions about the role of social support in rehabilitation settings from these investigations until further research has been conducted.

Returning to the Injury Response Model: Examining More Complex Relationships

At the outset of this discussion an injury response model was presented (Figure 1). This model has focused on three key components of injury response model: emotions, coping, and social support. For the sake of simplicity the various components of the model have been discussed separately. However, having provided a rationale for the inclusion of these *separate* aspects of the model, it seems appropriate to entertain ideas regarding the *combined* influence of various components of the model. For example, one might wonder if social support interacts with certain types of coping strategies to have a particular effect on rehabilitation adherence and recovery. Interestingly, research that has been conducted with respect to psychosocial antecedents to athletic injuries has provided several excellent examples of the utility of examining the influence of interacting stress-related variables. This research will be briefly reviewed as follows.

Smith, Smoll, and Ptacek (1990) conducted a comprehensive investigation of the relationship between life stress and the occurrence of injuries using social support, and coping resources as moderating

variables. Using a prospective design this study included over 450 high school athletes who were participating in both contact and noncontact sports. Smith and colleagues found that social support moderated the relationship between negative life stress and injury, but only among individuals were *also* low in coping resources. Thus, in this instance, coping resources and social support were considered *conjunctive moderator variables*. When this combination of psychosocial variables (i.e., high life stress, low social support, and low coping resources) were considered together they accounted for up 30% of the variance in injuries.

Additional work along this line has been conducted by Petrie (1992). Petrie found that female collegiate athletes were most susceptible to injury under conditions of high life stress *and* low social support. Under these high risk conditions negative life stress accounted for 12% to 22% of the variance in injuries.

Thus, in those instances when coping and social support have been shown to moderate the relationship between life stress and injury, the amount of explained variance has been relatively small (e.g., 12-30%). According to the guidelines suggested by Cohen (1992), effect sizes of .20, .50, and .80 are considered small, medium, and large, respectively. Hence, while a variety of psychosocial variables appear to be making a significant contribution toward the explained variance in injuries, these effect sizes would be considered small to moderate. Moreover, the available evidence regarding the psychosocial precursors to injuries suggests that the role of coping, and social support may not be amenable to simple "main effects" explanations. It is suggested that researchers trying to understand the

functional nature of these variables must be willing to explore potentially complex or subtle relationships (e.g., role of moderating variables, interactions). While the above mentioned research has been conducted in the context of psychosocial antecedents to injuries, it is suggested researchers studying the psychological effects of injuries may also benefit from the exploration of similarly complex relationships.

Need for the Present Investigation

Recent efforts have been made to expand our understanding of the role that psychosocial factors play during the recovery from athletic injuries. However, there have been several features of this research that have been of cause for concern. First, methodologically, there have been problems in the way that many of the constructs thought to be related to athletic injuries have been measured. Of particular concern has been the lack of attention to the potentially dynamic nature of variables such as social support and coping strategies. Do athletes rely on certain coping strategies during the early stages of recovery and shift to using other forms of coping during the later stages of recovery? Is there a degradation or mobilization of social resources that follow a major injury? Much of the psychological research to coping and social support has assumed that these variables are static and unchanging; thus, there is limited knowledge base from which to answer these questions. Therefore, to allow the dynamic nature of a variety psychosocial variables to be explored, the use of repeated assessments of these variables is advocated.

Another aspect of the injury-based literature is that it has tended to be of an anecdotal and descriptive nature. For instance, a substantial body

of research has been concerned with describing the mood responses of injured athletes (e.g., Lynch, 1988; Pederson, 1986; Weiss & Troxel, 1986; Wiese & Weiss, 1987). However, the extent to which the athletes' mood responses can be linked to outcome variables such as rehabilitation adherence and physical recovery, has not yet been explored in the athletic injury literature. Similarly, there is a paucity of research examining whether the coping strategies and social support resources of injured athletes are related to their rehabilitation adherence and recovery rates. For example, are certain coping strategies advantageous in terms of facilitating rehabilitation adherence and recovery? Are athletes lacking in adequate social support resources at greater risk for nonadherence and slower recovery? The answers to these types of questions are of considerable practical importance but at the time there is no empirical base from which to formulate a response.

Purposes

The purpose of this investigation is to better understand how injured athletes' mood, coping strategies, social support resources, and adherence levels change during the recovery process. In addition, the goal is to examine whether mood disturbances, coping, and social support are related to injury rehabilitation adherence and physical recovery. More specifically, this investigation has the following subpurposes:

- (1) Describe the demographic, psychosocial, adherence, and recovery characteristics of the sample of injured athletes involved in this investigation;

- (2) Examine whether changes in mood responses, coping strategies, perceived adequacy of social support resources, and adherence levels occur over the course of the rehabilitation process;
- (3) Assess whether mood, coping strategies, and social support are significant predictors of rehabilitation adherence and recovery;
- (4) Examine potential interactions between instrumental coping, social support and rehabilitation adherence. It should be noted that this purpose is viewed as exploratory in nature because it has not been previously examined within the context of injury rehabilitation settings; and,
- (5) Examine the relationship between rehabilitation adherence and physical recovery.

Hypotheses

The first purpose of this investigation was to describe the characteristics of this sample. Special emphasis was placed on describing how participants in this sample compare to other samples (e.g., individuals dealing with health stressors, athletes recovering from injuries) with regard to their mood, coping strategies, perceived adequacy of social support, and adherence patterns. Because of the descriptive nature of this purpose, no specific hypotheses were forwarded.

The second purpose of this investigation was to examine athletes' mood responses to injury, use of coping strategies, and the perceived adequacy of social support, and adherence levels over the course of the rehabilitation process. Based on this general purpose, two specific hypotheses were forwarded.

- (2a) With regard to mood responses to injury, it was predicted that mood disturbances would decline over time.**
- (2b) With respect to the use of coping strategies, it was predicted that early stages of rehabilitation process would be characterized by *palliative* and *negative emotion* coping strategies, with later stages of recovery characterized by *instrumental* coping.**

Because of the limited research examining potential changes in distraction coping, social support, and adherence patterns, no formal hypotheses were forwarded for these variables.

The third purpose of this study was examine whether mood, coping, and social support are significant predictors of rehabilitation adherence and recovery. Consistent with this purpose three hypotheses were forwarded:

- (3a) Mood disturbances will be inversely related to rehabilitation adherence.**
- (3b) Social support will be positively correlated with rehabilitation adherence.**
- (3c) *Instrumental* coping will be positively correlated with rehabilitation adherence.**
- (3d) *Distraction* and *negative emotion* coping will be inversely related to rehabilitation adherence.**

Because no previous research has examined the relationship between *palliative* coping and adherence, specific hypotheses regarding its

relationship to rehabilitation adherence were not forwarded. In addition, no hypotheses were forwarded relative to the joint relationships between mood, coping, social support and adherence and recovery.

The fourth purpose of this investigation was to examine potential interactions between instrumental coping and social support and their influence on rehabilitation adherence. Previous research (Smith et al., 1990) has suggested that coping and social support may act as conjunctive variables such that the explanatory power of these variables is significantly improved when considering what happens when they occur in specific combinations (e.g., low social support *and* low coping resources). For this reason, examining the potential interaction of these variables was included as purpose of this investigation. Based on the existing literature, it was hypothesized that:

- (4a) Individuals low in social support *and* instrumental coping will be at greater risk for nonadherence to their rehabilitation program.**

The final purpose of this study was to examine the relationship between injury rehabilitation adherence and recovery in injured athletes. Consistent with this purpose it was postulated that:

- (5) Rehabilitation adherence will have a positive relationship with physical recovery.**

CHAPTER II

METHOD

Participant Characteristics

Eligible participants included injured athletes, 16-40 years of age who lived in the Triad area of North Carolina and underwent reconstructive knee surgery for an anterior cruciate ligament (ACL) injury between August 15, 1994 and March 15, 1995. Subjects were required to be at least 16 years of age to ensure that participants would be legally eligible to drive to their rehabilitation sessions. Subjects older than 40 years of age were not eligible due to the increased healing time that is sometimes associated with recovering from surgery after this time (C. Dupree, personal communication, August 18, 1994). An "injured athlete" was operationally defined as someone who had ACL surgery primarily so that she/he could return to participating in sports and physical activity (as opposed to having surgery in order to simply be able to complete daily living activities). An ACL injury is considered a relatively severe injury that typically requires a minimum of 4 months of intensive rehabilitation before individuals can return to full sport or exercise activity (Steadman, 1995)

Only those individuals who had their surgeries completed by the local cooperating sports medicine clinic were eligible for participation. The specific surgical procedure used by the two surgeons in this clinic is referred to as a bone-patellar tendon-bone autograft reconstruction (see Appendix A for more information on the medical details associated with

ACL surgery). Including participants who underwent the same surgical procedure was considered important as there are over 100 different surgical procedures that can be used to repair a damaged ACL (Kronstain, 1995). Thus, possible confounds in recovery rates could result if the surgical procedure that participants underwent was not held constant.

Instrumentation

Participants completed paper and pencil measurements that included assessments of demographic and injury related variables, athletic identity, mood states, coping, and social support. In addition, behavioral measures of adherence and recovery were obtained from the participating sports medicine clinic. Details on each form of assessment are as follows.

Demographics

Participants completed a demographic questionnaire assessing background information such as name, age, sex, level of sport participation, number of hours per week involved in sports, previous injury history, date of injury, and surgeon (Appendix B).

Athletic Identity

A subjective assessment of athletic identity was used to establish both the strength and exclusivity of participants' commitment to an athletic self-perception. Athletic identity was assessed through the Athletic Identity Measurement Scale (AIMS) (Appendix C) (Brewer, Van Raalte, & Linder, 1993). The AIMS is a ten-item single factor scale that uses a 7-point Likert type scale (e.g., "I need to participate in sports to feel good about myself"; 1=strongly disagree; 7=strongly agree). Higher scores on the AIMS are associated with a stronger athletic self-schema.

Previous work relating to scale development indicated that the AIMS has both adequate reliability and validity. With regard to the internal reliability of the AIMS, Brewer and colleagues (1993) have reported an alpha coefficient of .93. With regard to the construct validity of the AIMS it has been shown that AIMS scores tend to significantly increase with the level of athletic involvement.

Mood Response to Injury

Subjects' mood reactions to their injuries were assessed through the shortened Profile of Mood States (POMS) (Shacham, 1983) (Appendix D) The shortened POMS is a self-report inventory that has been used widely in sport science research. The 37-items of the POMS ask respondents to indicate the extent to which in the last 3 weeks they experienced the following 6 emotions in regards to their injury: *tension-anxiety*, *depression-dejection*, *anger-hostility*, *vigor-activity*, *fatigue-inertia*, and *confusion-bewilderment*. Participants rated the degree to which they experienced these emotions on a Likert scale that ranges from 0 to 4. A score of 0 indicates the respondent did not experience much of that emotion; whereas a score of 4 indicates the respondent experienced that emotion a great deal. A seventh scale of total mood disturbance was calculated by subtracting the positive affect score (*vigor-activity*) from the sum of the remaining 5 negative scores (*tension-anxiety*, *depression-dejection*, *anger-hostility*, *fatigue-inertia*, and *confusion-bewilderment*). For purposes of this investigation only the total mood disturbance scale was calculated.

The shortened POMS has been shown to have adequate psychometric properties. The reliabilities of all six scales are above .80. Because the

shortened POMS is used to assess transient mood states, the test-retest reliability coefficients are not viewed as relevant. Finally, although information is not available regarding the construct and predictive validity of *shortened* POMS, these issues have been addressed for the full length POMS (McNair et al., 1981). Specifically a series of studies have been conducted inducing emotional changes through drug therapy and psychotherapy and which correlated the POMS with other measures of emotional states. Because the shortened POMS has been shown to be highly correlated with the full length POMS (.99) (Shacham, 1983), it was concluded that the shortened POMS also has adequate validity.

Coping Strategies

Coping strategies were assessed through the Coping with Health and Injury Problems (CHIP) scale (Endler et al., in press) (Appendix E). The CHIP is a 32-item self-report measure with four subscales. The four subscales include: *instrumental*, *distraction*, *palliative*, and *negative emotion*. The *instrumental* coping scale measures the degree to which respondents attempt to alleviate the source of stress or discomfort (e.g., “find out more information about the illness”). This scale assesses behaviors similar to those described elsewhere in the coping literature as “problem-focused coping” (Folkman & Lazarus, 1985; 1988). The *distraction* scale assesses individuals’ attempts to cope with a stressor by thinking about other things, engaging in unrelated activities, or seeking out the company of others (e.g., “listen to music”). The *palliative* scale taps the degree to which respondents engage in a variety of self-help activities and attempt to alleviate the unpleasantness of their stressor without actually trying to

trying to change the injury itself (e.g., “get plenty of sleep”). Finally, the *negative emotion* scale assesses the degree to which respondents are preoccupied with the emotional consequences of a health stressor (e.g., “wonder why it happened to me”). Respondents indicate on 5-point Likert scales the degree to which they engage in the above mentioned coping strategies during their injury recovery.

The CHIP’s four-factor structure was established using a large (N=598) derivation sample of adults coping with a variety of health problems (Endler et al., 1993). This four-factor structure was subsequently subjected to cross-validation using confirmatory factor analysis with a college sample (N=359) and a medical patient sample (N=390). Respondents in the medical sample were adults seeking medical treatment from practitioners for a variety physical symptoms and complaints.

The CHIP was developed specifically for use as an intraindividual coping measure i.e., it was developed to examine changes in individuals’ coping responses over time (Endler et al., 1993). Because the notion of viewing coping as a process is a central tenet of the current investigation, the use of an instrument designed for repeated assessments on the same individual was considered highly desirable. In addition, because the CHIP is an assessment that has been specifically developed for use with populations experiencing physical and health related problems, it was considered the most relevant of the available coping measures.

The CHIP appears to have adequate psychometric properties. Internal alpha coefficients for the CHIP range from .78 to .84. Preliminary construct validity data for the CHIP has shown the scale to converge and

diverge in a theoretically meaningful manner with a variety of coping style and psychological distress measures (Endler et al., in press).

Social Support

Social support was assessed through the Social Support Inventory (SSI) developed by Brown and colleagues (Brown et al., 1988; Brown et al., 1987) (Appendix F). The SSI is a 39-item self-report assessment that taps respondents' perception of the adequacy of their social resources. Respondents use a 7-point Likert scale to indicate their degree of satisfaction with the support/help they have received over the last 3 weeks (1= not at all satisfied; 7= very satisfied). A total subjective satisfaction score is obtained by summing all items.

Previous factor analyses of the SSI resulted in a 5-factor solution that includes: *acceptance-belonging*, *appraisal-coping assistance*, *behavioral-cognitive guidance*, *tangible assistance-material aid*, and *modeling*. However, in an effort to control the subject-to-variable ratio, for purposes of this investigation only a total measure of social support was analyzed. The use of a total measure of social support is consistent with the work of Petrie (1993) who has used the SSI to investigate the role of social support as an antecedent to athletic injuries.

Cronbach's alphas for the five above mentioned scales of the SSI were .93, .88, .81, .78, and .83, respectively and an overall reliability coefficient of .96 (Brown et al., 1988). Additionally, the SSI has both convergent and discriminant validity when correlated with other pertinent scales (Brown et al., 1987). Specifically, significant correlations have been observed between the SSI and measures of depression (Beck Depression Inventory; $r=-.53$),

anxiety (Self-Rating Anxiety Scale; $r=-.51$), psychosomatic symptoms (Psychosomatic Symptom Index; $r=-.34$), and another measure of social support (Qualitative Social Support Index; $r=.40$).

Adherence

Adherence was defined as the ratio of appointments actually attended compared to the number of appointments recommended by the sports medicine provider. For instance, if a participant actually attended 6 rehabilitation sessions over a three week time period but was supposed to attend 9 sessions (3 per week), his/her rehabilitation ratio was 6/9 or a .66. This use of this adherence ratio is consistent with the work of Duda and associates (1989).

It can be noted that the typical rehabilitation protocol for ACL surgery *most often* recommends that individuals attend rehabilitation sessions 3 times per week for the first 12 weeks. However, due to individual differences in recovery, occasionally fewer or more sessions per week will be recommended by the sports medicine provider. For this reason, adherence was measured as a ratio of the number of recommended sessions compared to the actual number of session attended at three week intervals. Taking repeated assessments of adherence in this way allowed for modifications in the recommended number of rehabilitation sessions to be taken into account.

It can also be noted that adherence was only measured through the 12th week of participants' rehabilitation programs. While it is recognized that sports medicine providers may recommend additional sessions beyond the 12th week, after this time there tends to be greater variability with

respect to individuals' programs depending on insurance considerations (limits on the number of visits) and individuals' progress at that time.

Physical Recovery

Physical recovery was assessed 12 weeks post-surgery through a computerized Kinetic Communicator (Kin-Com) evaluation. The Kin-Com evaluation is an assessment of muscle strength in the quadricep and hamstring muscles and is routinely conducted by the participating sports medicine clinic 12 weeks after ACL surgery.

A Kin-Com evaluation compares (among other things) the strength in the quadricep and hamstring muscles of the injured leg to muscle strength in the noninjured leg. A composite score that averaged the eccentric quadricep and eccentric hamstring strength was used as the measure of recovery. Both quadricep and hamstring recovery measures were included (rather than just eccentric quadricep *or* eccentric hamstrings) because overdevelopment in any one muscle group can place individuals at an increased risk of injury. Typically, ACL patients have recovered between 70-90% of their strength by the 12th week (C. Dupree, personal communication, May 14, 1995).

Procedure

The investigator contacted the sports medicine clinic on a weekly basis to determine if any ACL surgeries were scheduled for the following week. If any ACL surgeries were scheduled, the investigator obtained the names of potential participants and initiated phone contact with them. The purpose of this call was to explain the procedures of the investigation to potential participants. If potential participants agreed to participate, a one-

on-one meeting with the individual was arranged. This meeting took place prior to the subject's surgery.

The purpose of this one-on-one meeting was twofold. First, the nature of the study was explained to participants and they were informed that their involvement was voluntary and that all information will be kept confidential (see Appendix G-Human Consent Form). Participants were informed that their consent to participate included permission for the investigator to access records provided by the sports medicine clinic. The second purpose of this initial meeting was to have participants complete their first set of questionnaires with the investigator present to make sure that participants understood the materials (Appendixes B-F).

Subjects completed the psychometric assessments at five times: Pre-Surgery, and then 3, 6, 9, and 12 weeks post-surgery. Subjects returned the questionnaires to the investigator through return mail. Subjects who completed and returned all assessments within 7 days of when scheduled received \$5.00 per packet of questionnaires. In addition, participants who completed all five all assessments received a small gift bag containing a collection of complimentary gifts (e.g., water bottles, coupons) donated by a local business. These incentives were used to reduce participant attrition, however, it was made clear to participants that the cash awards and gift bags that they received were contingent only upon their returning the completed assessments i.e., the gifts are *not* a reward for attending rehabilitation sessions and/or performing well on their physical recovery test.

Precautions were taken to ensure that all data remained confidential. To accomplish this, all assessments were numerically coded by the investigator so that participants' responses remained confidential.

Assessments of each participants' adherence were provided by the sports medicine clinic at 3, 6, 9, and 12 weeks following surgery. A measure of physical recovery was provided to the investigator following participants' 12 week Kin-Com evaluation.

To summarize, the design of this investigation allowed for repeated measurements of mood responses to injury, coping strategies, social support, and adherence. In addition, the psychosocial variables noted above were linked to repeated assessments of adherence provided by the sports medicine clinics and a one-time measure of physical recovery. A summary of all assessments as they were measured throughout the investigation are summarized in Table 1.

Table 1. Summary of Assessments Measured Throughout the Investigation

	TIME OF ASSESSMENT				
	Time 1 (Pre-Surgery)	Time 2 (3 Weeks)	Time 3 (6Weeks)	Time 4 (9 Weeks)	Time 5 (12 Weeks)
Demographics & AIMS	+	-	-	-	-
Shortened POMS:					
•Mood Disturbance	+	+	+	+	+
CHIP:					
•Instrumental	+	+	+	+	+
•Negative Emotion	+	+	+	+	+
•Distraction	+	+	+	+	+
•Palliative	+	+	+	+	+
SSI:					
•Total Score	+	+	+	+	+
Adherence	-	+	+	+	+
Recovery	-	-	-	-	+

CHAPTER III

RESULTS

The data from this investigation were analyzed in several phases. First, preliminary analysis was conducted to verify that the inventories used were psychometrically sound. Following the preliminary analysis, the five primary phases of data analyses were conducted with each phase of the data analyses addressing one of the stated purposes.

The first purpose was to describe the demographic, psychological, and behavioral characteristics of the participants in this investigation. Thus, the first data analysis phase consisted of calculating descriptive statistics on the variables assessed and tabulating the intercorrelation structure of variables.

The second purpose was to examine whether significant changes in mood, coping (4 subscales: instrumental, negative emotion, distraction, and palliative), and social support occurred over the five assessment times. The data analysis relative to this second purpose consisted of graphing the data as well as conducting a series of repeated measure MANOVAs. Means contrasts were conducted to examine potentially significant differences revealed through the MANOVAs.

The third purpose was to examine the relationship between mood, coping, social support, adherence and recovery. Data analysis relative to predicting adherence as a single outcome variable was conducted through a series of stepwise regressions. It was anticipated that data analysis

relative to predicting *both* adherence and recovery as outcome variables would be conducted through canonical correlation. However, due to the small sample size, it was not considered appropriate to conduct this phase of the data analysis.

The fourth purpose was to examine interactions between coping, social support, and rehabilitation adherence. Because of the limited sample this phase of data analysis could not be adequately explored through regression analysis, as originally anticipated. However, descriptive statistics were used to visually examine the data.

The fifth and final purpose was to examine the relationship between rehabilitation adherence and physical recovery. This analysis was conducted using correlational analysis.

Preliminary Data Analysis

Before undertaking the analyses directly related to the five primary purposes, preliminary analyses was conducted. Specifically, reliability coefficients were determined for the psychometric inventories used in this investigation. Internal reliabilities were calculated based on participants' Time 1 (Pre-Surgery) responses. Scale reliability was established from Time 1 data because this assessment phase contained the largest number of participants (due to participant attrition), and was thought to provide the most stable estimate of scale reliability. Cronbach's alpha coefficients were as follows for the various psychometric assessments: athletic identity (AIMS) .98, mood disturbance .90 (POMS), instrumental coping .80 (CHIP), negative emotion coping .77 (CHIP), distraction coping .79 (CHIP), palliative coping .86 (CHIP), and social support .98 (SSI-SS). Each of these scales was

considered to have adequate reliability and all were retained for subsequent analysis.

Phase I-Descriptive Statistics

The names of 40 individuals who were thought to be scheduled for ACL surgery were obtained from the participating sports medicine clinic. Of these 40 potential participants, it was possible to reach 35 individuals prior to their surgery. All 35 of the individuals who were contacted about participation initially agreed to participate in the study and completed the Time 1 (Pre-Surgery) assessment. However, three of these individuals had to be excluded from the study because they did not meet the eligibility requirements (e.g., upon having surgery the surgeon discovered these individuals had experienced injuries that were not actually ACL injuries). Of the 32 individuals who had ACL surgery, 26 completed all the psychometric assessments; one subject was excluded from the data analysis because she experienced a serious setback in her recovery and had to undergo additional corrective surgery. Thus, the final sample included 25 individuals for whom all psychometric and adherence data were available. A summary of the means of those who chose to complete the study (N=25) versus those who discontinued their participation (N=6), as measured from Time 1 assessments, is found in Table 2. Inspection of Table 2 suggests those who discontinued participation in the study may have been somewhat younger and had lower overall adherence levels than those who completed the study.

Table 2. Comparisons of Participants Who Completed Versus Discontinued the Investigation

	Completed M (SD) N=25	Discontinued M (SD) N=6
Age	26.2 (8.0)	22.8 (5.8)
Hours/Week of Sport Participation	9.5 (5.9)	9.4 (5.5)
Athletic Identity	43.9 (12.5)	45.5 (14.0)
Mood Disturbance	34.6 (18.9)	39.0 (22.3)
Instrumental Coping	26.7 (6.3)	27.5 (4.9)
Negative Coping	21.6 (7.7)	21.7 (6.7)
Distraction Coping	22.2 (7.0)	23.5 (2.8)
Palliative Coping	17.2 (6.6)	19.2 (4.8)
Social Support	207.1 (50.6)	192 (34.4)
Adherence	.81 (.24)	.55 (.32)
Recovery	.85 (.09)	.*

* Insufficient data available to accurately calculate .

Although psychometric information and adherence data was available for the 25 individuals who completed all the study (i.e., returned the 5 sets of questionnaires and had adherence data available), only 15 (60%) of the participants underwent their physical recovery evaluation at the

usual 12 week testing time. Individuals did not undergo their Kin-Com evaluation at all or at the usual time for a variety of reasons which included: experiencing minor setbacks in recovery (resulting in contraindications for having a Kin-Com evaluation), moving, and traveling. Table 3 displays the number of individuals for whom data were available relative to the type of data. It is hoped that explicitly identifying the number of participants for whom data were available will assist the reader in evaluating the results of the data analysis to follow. The remaining descriptive analyses were based on the responses of the 25 individuals at Time 1 unless otherwise noted.

Table 3. Summary of Data Availability

	Psychometric Inventories	Adherence	Recovery
Number of Participants	25	25	15

Demographic Data

The 25 individuals who completed the study ranged from 16 to 38 years of age with a mean age of 26.2 ($SD = 8.0$) and a median age of 27. There were 18 males (72%) and 7 females (28%). The ratio of male to female participants included in this study was somewhat surprising as recent medical statistics have indicated that females are more prone to ACL injuries than males (Kronstain, 1995).

Rehabilitation Clinic Data

Twenty five individuals completed all the psychometric assessments associated with this investigation and had their surgery through the same sports medicine clinic. However, not all participants completed their rehabilitation at the clinic where they had surgery. For reasons related to convenience and insurance considerations, 7 individuals choose to complete their rehabilitation at other clinics. To verify that the location where participants completed their rehabilitation did not introduce a systematic source of variation, two series of analyses were conducted. First, a series of univariate tests were conducted to assess whether there were significant differences at the outset of the investigation between participants relative to clinic location. These two groups were compared with respect to athletic identity, mood disturbances, coping, and social support; however, none of these analyses reached statistical significance.

While these univariate analyses indicated that the two groups did not differ at the outset of the investigation, it could be argued that significant differences developed over time based on participants' choice of rehabilitation clinic (e.g., the therapists at one clinic provided more social support than another clinic). To explore this possibility, a series MANOVAs were conducted, examining differences by clinic in mood disturbances, coping (instrumental, negative emotion, distraction, and palliative), and social support over time. Similar to the univariate analyses, none of these multivariate analyses reached statistical significance. Based on the nonsignificance of both the univariate and multivariate tests, all further analysis were collapsed across the clinic variable.

Injury Background. Subjects experienced their ACL injuries while participating in the following activities: 9 basketball (36%), 6 football (24%), 3 soccer (12%), and 7 other (28%). With respect to participants' previous injury history, 14 (56%) of the individuals indicated that they had previously experienced a major sport related injury. Additionally, 2 (8%) of the participants reported they had previously experienced a major non-sport related injury.

The amount of time participants waited between *initially* injuring themselves and actually having surgery ranged from 2 weeks to 16.7 years with an average wait of 1.2 years ($SD = 3.5$) and median wait of 2 months. The positive skew of this distribution appeared to be due to the fact that several of the participants continued to reinjure their knee before deciding to have surgery or had undergone multiple surgeries on their knee following their original injury.

Sport Participation Data. Participants designated their level of sport participation as follows: 15 recreational (60%), 8 high school (32%), and 2 collegiate (Division III) (8%). The number of hours spent per week in sport related activities ranged from 2 to 20 hours, with the mean and median number of hours being 9.5 ($SD = 5.9$) and 9.5, respectively.

Participants were assessed on the perceived importance of their sport participation through a one-item question that used a Likert scale (1=not at all important; 5=extremely important). Mean and median rating of sport importance were 4.0 ($SD = 1.0$) and 4, respectively, with responses ranging from 2 to 5. Additionally, participants were asked how important it was for them to make a full recovery from their surgery through a one-item

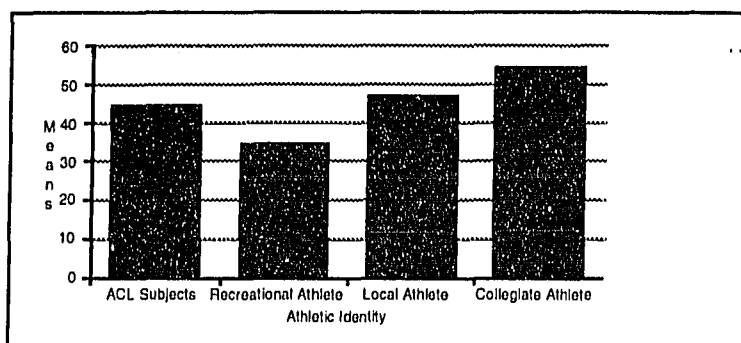
question using a Likert scale (1=not at all important; 5 extremely important). Mean and median ratings of the importance of full recovery were 4.8 ($SD = .4$) and 5.0, respectively, and responses ranged from 4 to 5.

Athletic Identity

The strength and exclusivity of participants' commitment to an athletic self-perception was assessed through the AIMS (Brewer et al., 1993). Subjects responded using a 7-point Likert type scale that includes ten single factor items. Higher scores on the AIMS are associated with a higher athletic identity. Subjects' respective mean and median ratings of athletic identity were 43.9 ($SD = 12.5$) and 45, and responses ranged from 18 to 67.

Figure 2 provides a comparison of the AIMS means from this investigation to those reported by Brewer and colleagues (1993) for male recreational/fitness, local/regional, and collegiate athletes. As can be seen from Figure 2, participants in this investigation were, on average, higher in athletic identity than recreational/fitness athletes, yet lower in athletic identity than local/regional or collegiate athletes. It can be noted that the Brewer et al. data provided in Figure 2 summarizes only the responses of males athletes. Scale development work with the AIMS has indicated that males tend to report higher levels of athletic identity (Brewer et al., 1993). However, in this sample males and females scored very similarly on the AIMS with males reporting average AIMS scores of 44.9 ($SD=12.2$) as compared to the female average AIMS scores of 41.3 ($SD=13.6$).

Figure 2. Means of Athletic Identity Across Various Samples



Mood Disturbance

Mood disturbances were assessed through the shortened POMS, which is 37-item scale measuring transient affective states. Participants respond using a 5-point Likert type scale with higher scores on the POMS being associated with greater mood disturbances. Participants' respective mean and median ratings of mood disturbances were 34.6 ($SD = 18.9$) and 36, and responses ranged from 5 to 70. Limited normative data are available for the shortened POMS, however, these average mood disturbance scores are comparable to data reported by Shacham (1983). Among a sample of cancer patients seeking assistance with pain management, Shacham reported average mood disturbances of 36.3.

Another way to compare these mood disturbances is relative to data reported by Smith, Stuart, Wiese-Bjornstal, Milliner, O'Fallon and Crowson, (1993). Smith et al. administered the *full length* version of the POMS to a group of competitive (high school, college, and minor league) athletes 1 week after these athletes had experienced injuries. The Smith et al. data

can be reasonably compared to the data from this investigation if one corrects for the number of items on two instruments (the shortened POMS and the full length POMS). Adjusted average mood disturbances among the Smith et al. sample were 1.18¹. These negative affect levels were similar to the adjusted level of mood disturbances of 1.15 among the current sample. It is understood that comparing the results of an abridged version and a full length version of two psychometric assessments should generally be viewed with caution, however, a correlation of .99 between these two versions of the POMS has been reported (Shacham, 1983), thus making comparisons between these scales reasonable.

Coping

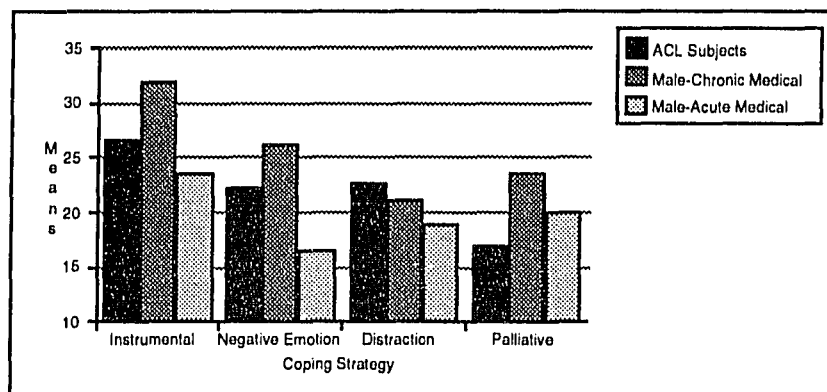
Coping was assessed through the CHIP, which is a 32-item scale. Participants respond using a 5-point Likert scale that includes four factors: instrumental, negative emotion, distraction, and palliative coping. Higher scales on the CHIP are associated with greater use of a particular coping strategy. Respondents' respective mean and median ratings for the four types of coping were as follows: instrumental 26.7 (SD = 6.3) and 27, negative emotion 21.6 (SD = 7.7) and 21, distraction 22.2 (SD =7.0) and 24, and palliative 17.2 (SD = 6.6) and 15.

The CHIP means reported at Time 1 from this investigation can be compared to data reported by Endler and associates (in press) (see Figure 3).

¹ Smith et al., 1993 provide data using the subscales of the POMS. i.e., they do not provide a total mood disturbance score. To calculate an adjusted *total* mood disturbance, the mean scores for the POMS' subscales were divided by the number of items that make up the subscale score. These subscales means were then summed and divided by 5-the number of subscales that go into calculating mood disturbance for the POMS. The same procedures was used for determining adjusted mood disturbances scores for the present sample.

Specifically, Endler and colleagues have reported means for the four subscales of the CHIP among a sample of males seeking treatments for acute and chronic health stressors. (Endler and colleagues defined a chronic health stressor as a health problem that the individual would have to confront for at least 2 months and as a condition for which is was unlikely that there would be a “tangible cure” for in the near future.) The data from this investigation parallel those reported by Endler and colleagues with regard to the relative levels of coping strategies that were used. More specifically, Endler et al. found that instrumental coping was the most frequently employed coping strategy regardless of whether the stressor was chronic or acute– a trend that was echoed among participants in this investigation.

Figure 3. Comparison of Means for Coping Strategies



Social Support

Participants' satisfaction with their social support was assessed through the Social Support Inventory (SSI-SS) developed by Brown and

colleagues (1987;1988). The SSI-SS is 39-item questionnaire that asks respondents to rate on a 7-point Likert scale the degree to which they were satisfied with the social support they had received. Although the SSI-SS is a multidimensional measure of social support having five subscales (acceptance-belonging, appraisal-coping assistance, behavioral-cognitive guidance, tangible assistance-material aid, and modeling), only a total measure of social support was used in this investigation.

Participants' respective mean and median ratings of perceived social support were 207.1 ($SD=50.6$) and 208, and responses ranged from 95 to 273. These levels of social support are higher than those that have been reported among other college student samples. In particular, Brown and colleagues (1988) reported average levels of social support of 184.3 ($SD=52.6$) among a sample of college students; Petrie (1993) reported mean social support levels of 185.8 ($SD=55.0$) from a sample of male collegiate athletes.

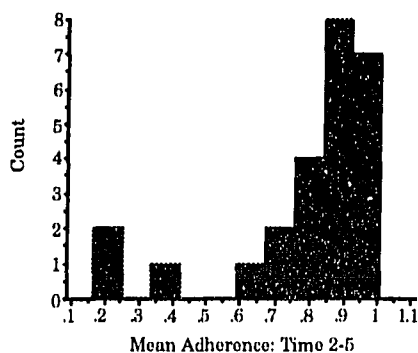
Adherence Data

Adherence was measured as the ratio of appointments actually attended compared to the number of appointments prescribed by the sports medicine provider (e.g., .33 would indicate that one session was attended out of the three sessions prescribed). Mean and median adherence levels from Time 2-Time 5 were .81 ($SD=.24$) and .89, respectively. The overall mean levels of adherence from this sample are comparable to those described by Duda and colleagues (1989). Among a sample of injured university athletes Duda et al. reported mean adherence levels of .83 ($SD=.17$).

Despite the relatively high adherence levels evidenced among this sample, it can be noted that this distribution was negatively skewed. Figure

4 shows the frequency distribution of participants scores' with respect to adherence Time 2-5. As Figure 4 suggests, although the majority of participants had moderate to high attendance averages, three participants demonstrated very low attendance rates. Open ended responses indicated that work conflicts and transportation difficulties were the most frequent reasons for missing rehabilitation sessions.

Figure 4. Frequency Distribution of Mean Adherence Levels



Recovery Data

Assessments of recovery were obtained through a computerized testing machine, known as a Kin-Com evaluation. Recovery was measured as the ratio of the strength in the surgically involved leg compared to the strength in the uninvolved leg at Time 5 (12 weeks Post-surgery). Strength was defined as the weighted average of eccentric quadriceps and eccentric hamstring muscle strength. Thus, a score of .85 would indicate that the involved leg recovered 85% of quadriceps and hamstring eccentric strength when compared to the uninvolved leg. Recovery ratios ranged from .64 to .98 with a mean .85 ($SD=.09$) and a median of .83. These recovery levels would

appear to be quite acceptable according to the standards set by the cooperating sports medicine clinic. Typically, it is expected that individuals will recover 70-90% of their strength by 12 weeks post-surgery (C. Dupree, personal communication, May 14, 1995).

Intercorrelation Structure of Variables

Correlations among the variables of interest (mood disturbance, instrumental coping, negative emotion coping, distraction coping, palliative coping, social support, and adherence) are presented in Tables 4-8. Because these variables were assessed repeatedly, the intercorrelations are reported for each assessment time.

In examining Tables 4-8, several observations are apparent. First, there is a consistent and relatively high correlation between mood disturbance and negative emotion coping (ranging from .68 to .89) over the five assessment periods. This relationship is not surprising given that each of these variables attempts to tap aspects of negative affect.

Second, it can be noted that many of the correlations between variables did not remain stable over the course of the investigation. For instance, overall, the correlations between mood disturbance and palliative coping over time are as follows: Time 1=.40, Time 2=.22, Time 3=.67, Time 4=.69 and Time 5=.47). Finally, it can be noted that, in general, the correlations between variables were lowest during the Time 2 assessment period.

Table 4. Time 1 (Pre-Surgery) Pearson Product-Moment Correlations Among Mood Disturbance, Coping, and Social Support Variables

	Mood Disturbance	Instru. Coping	Negative Coping	Distraction Coping	Palliative Coping	Social Support	Adherence
Mood Disturbance	1.0						
Instrumental Coping	.63	1.0					
Negative Coping	.68	.61	1.0				
Distraction Coping	.47	.35	.39	1.0			
Palliative Coping	.40	.32	.41	.82	1.0		
Social Support	.08	.04	-.05	.20	.16	1.0	
Adherence*	-	-	-	-	-	-	-

* Time 1 (Pre-Surgery) Adherence data not applicable.

Table 5. Time 2 (3 Weeks Post-Surgery) Pearson Product-Moment Correlations Among Mood Disturbance, Coping, Social Support, and Adherence Variables

	Mood Disturbance	Instru. Coping	Negative Coping	Distraction Coping	Palliative Coping	Social Support	Adherence
Mood Disturbance	1.0						
Instrumental Coping	.21	1.0					
Negative Coping	.70	.31	1.0				
Distraction Coping	.42	.13	.51	1.0			
Palliative Coping	.22	.21	.29	.38	1.0		
Social Support	.11	.30	-.04	.24	-.03	1.0	
Adherence	.20	.17	.14	-.03	-.16	-.19	1.0

Table 6. Time 3 (6 Weeks Post-Surgery) Pearson Product-Moment Correlations Among Mood Disturbance, Coping, Social Support, and Adherence Variables

	Mood Disturbance	Instru. Coping	Negative Coping	Distraction Coping	Palliative Coping	Social Support	Adherence
Mood Disturbance	1.0						
Instrumental Coping	.68	1.0					
Negative Coping	.89	.73	1.0				
Distraction Coping	.69	.56	.68	1.0			
Palliative Coping	.67	.68	.69	.76	1.0		
Social Support	.11	-.04	.03	.21	.08	1.0	
Adherence	.06	.28	.06	.05	-.09	.01	1.0

Table 7. Time 4 (9 Weeks Post-Surgery) Pearson Product-Moment Correlations Among Mood Disturbance, Coping, Social Support, and Adherence Variables

	Mood Disturbance	Instru. Coping	Negative Coping	Distraction Coping	Palliative Coping	Social Support	Adherence
Mood Disturbance	1.0						
Instrumental Coping	.62	1.0					
Negative Coping	.83	.62	1.0				
Distraction Coping	.65	.36	.57	1.0			
Palliative Coping	.69	.64	.47	.72	1.0		
Social Support	.17	.07	-.11	.33	.22	1.0	
Adherence	.05	.38	.07	-.05	-.09	.27	1.0

Table 8. Time 5 (12 Weeks Post-Surgery) Pearson Product-Moment Correlations Among Mood Disturbance, Coping, Social Support, and Adherence Variables

	Mood Disturbance	Instru. Coping	Negative Coping	Distraction Coping	Palliative Coping	Social Support	Adherence
Mood Disturbance	1.0						
Instrumental Coping	.61	1.0					
Negative Coping	.77	.49	1.0				
Distraction Coping	.49	.57	.66	1.0			
Palliative Coping	.47	.55	.53	.75	1.0		
Social Support	-.06	.04	-.22	.06	-.08	1.0	
Adherence	-.31	.15	-.16	-.09	-.35	.10	1.0

Phase II-Time Changes

As mentioned previously, the second phase of data analysis focused on examining potential changes in mood disturbances, coping (4 subscales: instrumental, negative emotion, distraction, and palliative), social support, and adherence. Three sources of information have been provided in an attempt to ascertain whether significant time changes in the variables of interest were apparent. First, means and standard deviations for each of the variables of interest are provided and displayed in Table 9.

Table 9. Means and Standard Deviations for Variables Measured Over Time

Variable	Time 1 (Pre-Surgery) M (SD)	Time 2 (3 weeks) M (SD)	Time 3 (6 weeks) M (SD)	Time 4 (9 weeks) M (SD)	Time 5 (12 weeks) M (SD)
Mood Disturbance	34.6 (18.9)	39.0 (17.3)	29.7 (24.7)	23.2 (21.5)	25.0 (22.0)
Instrumental Coping	26.7 (6.3)	27.2 (4.1)	24.3 (5.6)	23.2 (6.1)	23.6 (6.8)
Negative Coping	21.6 (7.7)	22.8 (6.4)	20.3 (7.6)	18.6 (6.5)	18.8 (6.5)
Distraction Coping	22.2 (7.0)	22.4 (5.9)	22.0 (6.7)	22.0 (7.2)	21.8 (7.4)
Palliative Coping	17.2 (6.6)	20.1 (4.4)	16.6 (4.4)	15.8 (4.5)	15.5 (4.8)
Social Support	207.1 (50.6)	196.7 (56.6)	200.6 (60.7)	200.7 (53.1)	200.5 (56.8)
Adherence	NA	.90 (.18)	.77 (.25)	.81 (.32)	.76 (.33)

A second way that changes in the variables of interest have been explored is through graphs illustrating overall trends. When examining the various graphs it is important to bear in mind two points. First, it should be realized that small changes may appear to be dramatic given the means and standard deviations of the particular variable. Second, because different measurement units were used in the graphs, the magnitudes of differences should not be compared across graphs.

Finally, time changes in the variables of interest have been examined through a series of repeated measures MANOVAs. Multivariate analyses were considered more appropriate than univariate analysis because this

approach is robust to violations of the assumption of sphericity (as estimated by epsilon). Violations of the assumption of sphericity may result in elevated Type I error rates (Schutz & Gessaroli, 1987). Tests of the assumption of sphericity within this data set indicated violations of sphericity with G-G epsilon values ranging from .43 to .71 on the variables of interest. Follow-up repeated means contrasts were conducted to examine potentially significant differences revealed through the MANOVAs. To limit the number of contrasts conducted each time period was only compared to the preceding time period (e.g., Time 2 was compared to Time 1 but not to Time 3, 4 or 5). Follow-up contrasts which reached statistical significance have been marked on the accompanying graphs as "S"; contrasts which failed to reach significance have been identified on the graphs as "NS."

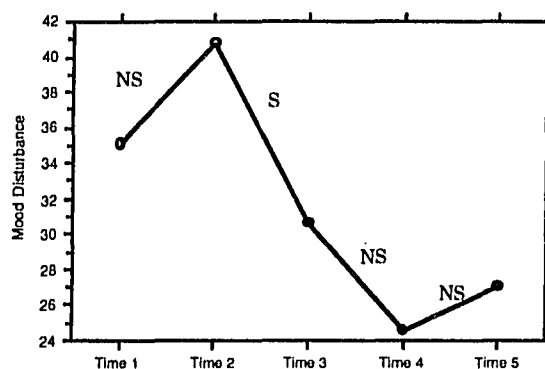
It can be noted that the Bonferroni correction is sometimes used to control for the probability of making a Type I error when conducting multiple analyses. However, an adjusted alpha level was not used when examining potential time changes in the variables of interest because specific predictions that varied in their directions had been forwarded regarding the trends most of the variables would follow (e.g., mood disturbances would decrease over time). Under these circumstances the use of the Bonferroni correction is considered to be overly conservative and results in a loss of power (L. Hardy, personal communication, June 5, 1995).

Mood Disturbance

The graph in Figure 5 illustrates the pattern of changes in mood disturbance over the five assessment periods. As shown in Figure 5 mood

disturbances were highest at Time 2 and declined from Time 2 through Time 4 and increased slightly at Time 5. This overall downward trend was expected as it was predicted mood disturbance would diminish over the course of rehabilitation.

Figure 5. Mood Disturbance from Time 1 to Time 5



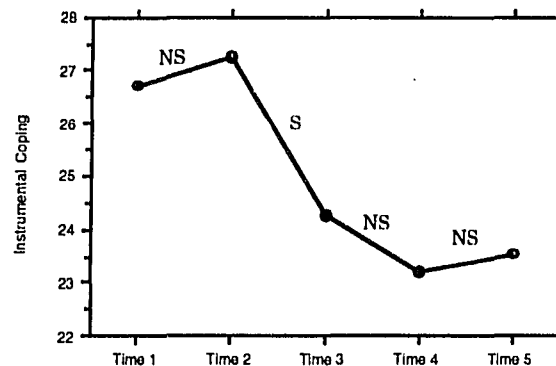
A repeated measures MANOVA resulted in a significant time effect, Wilks's λ , $F(4, 21) = 10.73$, $p < .0001$. Approximately 17% of the variance was accounted for by time effects, $\eta^2_{alt} = .17$. Using the guidelines suggested by Cohen (1992), effect sizes of .20, .50, and .80 are considered small, medium, and large, respectively. Thus, the amount of explained variance in this instance would be considered small.

To further explore the meaning of the omnibus test, follow-up means contrasts were conducted. These contrasts indicated that differences in mood disturbances did not differ significantly from Time 1 to Time 2, Time 3 to Time 4, or Time 4 to Time 5. However, significant differences were noted from Time 2 to Time 3.

Instrumental Coping

The graph in Figure 6 illustrates the overall pattern of instrumental coping over the five assessment periods. As shown in Figure 6, instrumental coping was used slightly more at Time 2 as compared to Time 1, but its use declined from Time 2 through Time 4, and increased slightly at Time 5. This overall trend was unexpected as it was predicted that the use of instrumental coping would actually increase over the course of recovery.

Figure 6. Instrumental Coping from Time 1 to Time 5



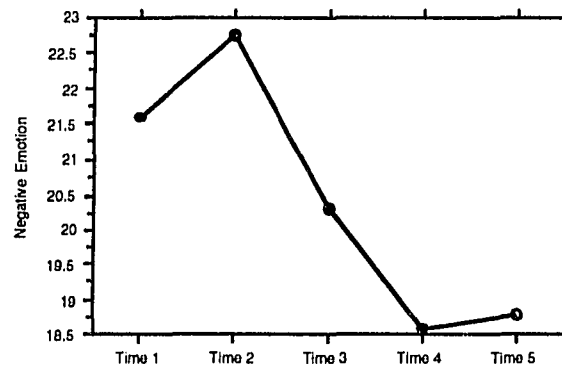
A repeated measures MANOVA resulted in a significant time effect, Wilks's λ , $F(4, 21) = 3.14$, $p < .04$. Approximately 17% of the variance was accounted for by time effects, $\eta^2_{alt} = .17$. To further explore the meaning of the omnibus test, follow-up means contrasts were conducted. These contrasts indicated that differences in instrumental coping did not differ significantly from Time 1 to Time 2, Time 3 to Time 4, or Time 4 to Time 5. However, significant differences were noted from Time 2 to Time 3.

Negative Emotion Coping

The graph in Figure 7 illustrates the overall pattern of negative emotion coping over the five assessment periods. Figure 7 illustrates that negative emotion coping was highest at Time 2 and declined from Time 2 through Time 4. Between Time 4 and Time 5 there were only minor increases in the use of negative emotion coping. This overall trend was expected as it was predicted that the use of negative emotion coping would diminish over the course of recovery.

It can be noted that the pattern of negative emotion coping closely matches that of mood disturbances shown in Figure 5. That the patterns of negative emotion coping and mood disturbances were similar (Figures 7 and 5) is not surprising, given the relatively high correlation of these variables that were noted previously (see Tables 3-7).

Figure 7. Negative Emotion Coping from Time 1 to Time 5



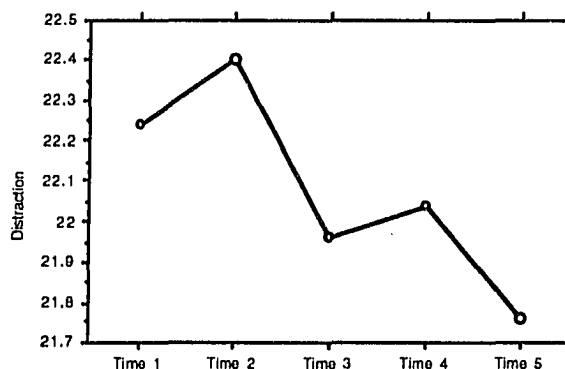
A repeated measures MANOVA resulted in a significant time effect, Wilks's λ , $F(4, 21) = 4.27$, $p < .01$. Approximately 13% of the variance was accounted for by time effects, $\eta^2_{alt} = .13$. Follow-up contrasts indicated that

differences in negative emotion coping did not differ significantly from Time 1 to Time 2, Time 2 to Time 3, Time 3 to Time 4, or Time 4 to Time 5. Therefore, although contrasts of sequential time phases revealed no significant differences, it can be logically concluded that mood disturbances significantly declined from Time 2 to Time 4.

Distraction Coping

The graph in Figure 8 illustrates the overall pattern of distraction coping over the five assessment periods. As shown in Figure 8, the use of distraction coping increased slightly from Time 1 to Time 2, decreased from Time 2 to Time 3, increased slightly from Time 3 to Time 4, and decreased from Time 4 to Time 5.

Figure 8. Distraction Coping from Time 1 to Time 5



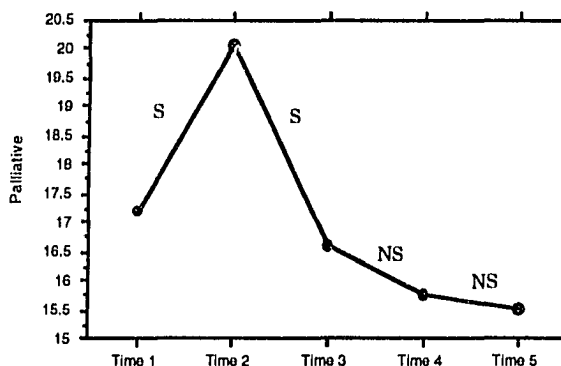
A repeated measures MANOVA resulted in a nonsignificant time effect, Wilks's λ , $F(4,21) = .25$, n.s. Only 1% of the variance was accounted for by time effects, $\eta^2_{alt} = .01$. No further follow-up contrasts were conducted due to the nonsignificant omnibus test. No formal hypotheses were

forwarded with respect to changes in the use of distraction coping over time; thus, the MANOVA and graph results were not evaluated relative to any hypotheses.

Palliative Coping

The graph in Figure 9 illustrates the overall pattern of palliative coping over the five assessment periods. Figure 9 indicates that the use of palliative coping was increased from Time 1 to Time 2 and declined from Time 2 through Time 4. Between Time 4 and Time 5 changes in the use of palliative coping were minimal.

Figure 9. Palliative Coping from Time 1 to Time 5



A repeated measures MANOVA resulted in a significant time effect, Wilks's λ , $F(4,21) = 8.65$, $p < .0003$. Approximately 22% of the variance was accounted for by time effects, $\eta^2_{alt} = .22$. Follow-up contrasts indicated that the use of palliative coping significantly increased from Time 1 to Time 2 and decreased significantly from Time 2 to Time 3. No other significant differences in palliative coping were revealed. Relative to the hypotheses that were forwarded regarding the use of palliative coping, it can be noted

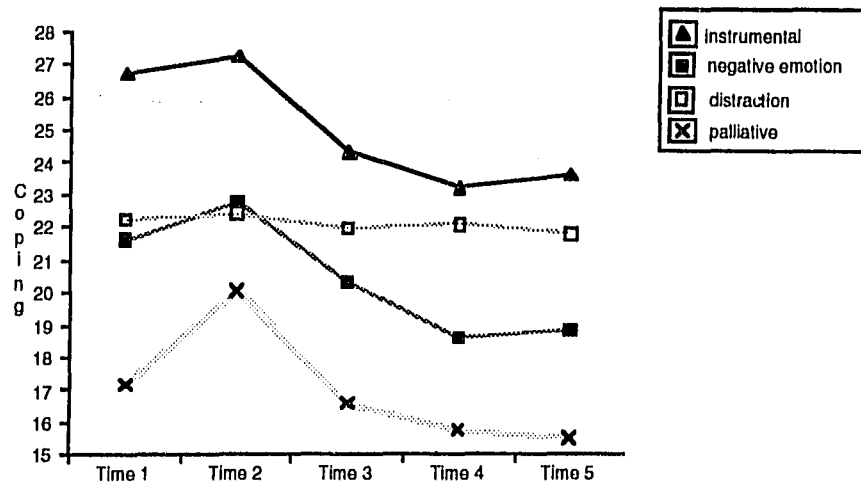
that it was hypothesized that early stages of rehabilitation would be characterized by palliative coping. To some extent this hypothesis was supported as participants used palliative the most during Time 2 (3 weeks Post-surgery) of their rehabilitation and used this strategy less at Times 3, 4, and 5.

Summary of Coping Strategies

The four previous sections have provided individual graphs illustrating the coping strategies used over the 5 assessment periods. Given that these various forms of coping are all subscales of the same inventory (the CHIP), it is possible to summarize these results in one graph (see Figure 10). When the data are summarized in this manner, several trends are apparent. First, it can be noted that regardless of the assessment time, participants reported using instrumental coping to a greater extent than either of the other three forms of coping. Alternatively, palliative coping was the coping strategy used the least over the five assessment periods.

In addition, it can be noted that instrumental, negative emotion, and palliative coping followed surprisingly similar patterns. That is, there was an increase in the use of these strategies from Time 1 to Time 2, however, from Time 2 to Time 4 participants relied less on these coping strategies. Finally, from Time 4 to Time 5 the use of these coping strategies remained relatively stable.

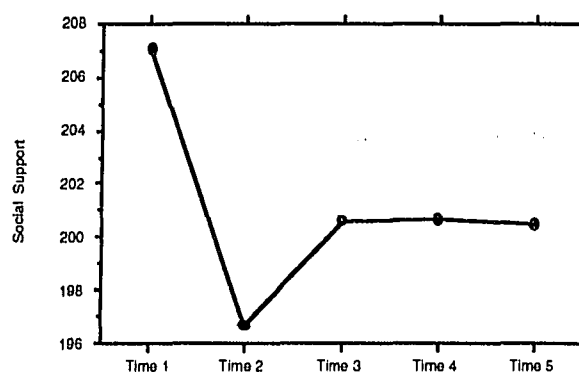
Figure 10. Summary of Coping Strategies



Social Support

The graph in Figure 11 illustrates the overall pattern of social support over the five assessment periods. As shown in Figure 11, social support was highest at Time 1 and lowest at Time 2, increased from Time 2 to Time 4, and then declined from Time 4 to Time 5. However, from Time 2 to Time 5 social support levels were never as high as they had been at Time 1 (Pre-Surgery).

Figure 11. Social Support from Time 1 to Time 5



No formal hypotheses were forwarded relative to changes in social support. A repeated measures MANOVA resulted in a nonsignificant time effect, Wilks's λ , $F(4,21) = .87$, n.s. Only 3 % of the variance was accounted for by time effects, $\eta^2_{alt} = .03$. No further follow-up contrasts were conducted due to the nonsignificant omnibus test.

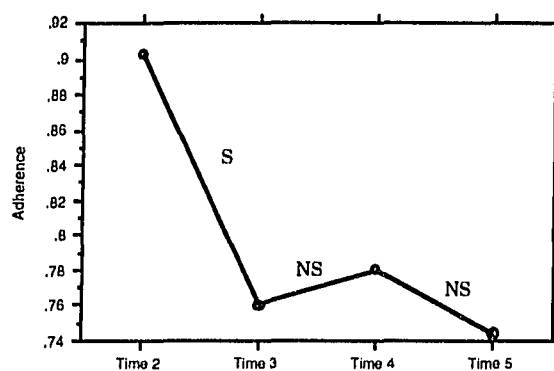
In this instance, while the MANOVA did not reveal a significant time effect, it is interesting to note the drop in the perceived adequacy of social support from Time 1 (Pre-Surgery) to Time 2 (3 weeks Post-Surgery). This decline in social support may have been obscured in the MANOVA procedures because social support levels subsequently increased from Time 2 through Time 4. To conclude, the graph of the overall pattern of social support seems to provide some interesting insights that are not apparent by simply examining the MANOVA results.

Adherence

The graph in Figure 12 illustrates the pattern of changes in adherence over the four assessment periods (Time 2 through Time 5). It can be noted that adherence levels were not measured at Time 1 as Time 1

constituted the Pre-Surgery assessment period. As shown in Figure 12, adherence levels were highest at Time 2 and declined from Time 2. Adherence levels were relatively stable from Time 2 to Time 5. No formal hypotheses had been forwarded with respect to adherence levels.

Figure 12. Adherence from Time 2 to Time 5



A repeated measures MANOVA resulted in a significant time effect, Wilks's λ , $F(4, 21) = 7.32$, $p < .001$. Approximately 15% of the variance was accounted for by time effects, $\eta^2_{alt} = .15$. Follow-up contrasts indicated that adherence significantly decreased from Time 2 to Time 3 although no other significant differences in adherence levels were revealed from Time 3 through Time 5. These results will not be discussed relative to the hypotheses because no hypotheses were forwarded relative to time changes in adherence.

Phase III-Relationship Between Psychosocial Variables, Rehabilitation Adherence, and Recovery

The third purpose of this investigation was to explore whether mood disturbances, coping strategies (instrumental, negative emotion, distraction, and palliative), and social support were significant predictors of rehabilitation adherence and recovery. This purpose was divided into two subpurposes: one to examine the predictors of adherence, and another to explore the predictors of both adherence *and* recovery.

Predictors of Rehabilitation Adherence

Psychosocial predictors of adherence were explored through stepwise multiple regression. Because this investigation involved a repeated measures design, these analyses were conducted four times: Time 2, Time 3, Time 4, and Time 5.

Before conducting the regression analyses, scatterplots were produced (plotting independent variables by the dependent variable) to examine whether linear analyses were the most appropriate. The plots indicated that linear regression could be appropriately used.

Time 2. Stepwise multiple regression with mood disturbance, coping (instrumental, negative emotion, distraction, and palliative coping), and social support as predictors of adherence was conducted for Time 2. When the above mentioned variables were entered into a stepwise multiple regression analysis, none of the variables were found to be significantly related to rehabilitation adherence.

Time 3. The stepwise regression at Time 3 involved the same variables as Time 2 with one exception, namely, adherence levels from

Time 2 were forced into the regression model as the first predictor variable. The addition of the variable is based on the well established finding that past behavior tends to be significant predictor of current behavior (McAuley, 1992). This method of using adherence from the preceding assessment phase as the first variable in the regression model was used for the remaining stepwise regression analyses.

The results of the Time 3 stepwise analysis indicated that the only significant predictor of adherence was adherence from Time 2, $F(1, 24) = 10.81, p < .05$, which accounted for 33% of the variance ($R^2 = .33$).

Time 4. Stepwise regression analysis of the predictors of adherence at Time 4 were similar to those from Time 3. More specifically, this analysis indicated that the only significant predictor of adherence at Time 4 was adherence from Time 3, $F(1, 24) = 27.56, p < .05$, which accounted for 56% of the variance ($R^2 = .56$).

Time 5. Stepwise regression analysis of the predictors of adherence at Time 5 indicated that the only significant predictor of adherence was adherence from Time 4, $F(1, 24) = 87.08, p < .05$, which accounted for 81% of the variance ($R^2 = .81$).

Summary of predictors of adherence. The stepwise regression analyses provided no support for the hypotheses that the psychosocial variables of interest (mood disturbances, coping, and social support) constituted reliable predictors of rehabilitation adherence. Instead the only consistent predictor of adherence at Times 3 through Time 5 was adherence from the previous 3-week period. The ability of adherence from the previous 3-week period to explain continued adherence apparently grew more salient

as the amount of explained variance ranged from 33% at Time 3, 56% at Time 4, 81% at Time 5.

Combined Relationship Between Psychosocial Variables, Adherence, and Recovery

At the outset of the investigation, it was hoped that the available participant pool would be large enough to conduct data analysis examining psychosocial predictors of *both* adherence and recovery as outcome variables. This analysis was to be performed using canonical correlation. However, when using canonical correlation in the social sciences a 10:1 subject to variable ratio is recommended (Tabachnick & Fidell, 1989). Given the discrepancy between the recommended size of the participant pool and the actual number of participants from this sample, it was not considered appropriate to conduct this portion of the data analysis.

Phase IV-Interactions Between Coping, Social Support, and Adherence

The fourth purpose of this investigation was to examine potential interactions between coping, social support, and adherence. It was hypothesized that individuals low in instrumental coping *and* low in social support would be at greater risk for nonadherence for rehabilitation. The steps undertaken to attempt this analysis were as follows. First, individuals from Time 2-Time 5 who reported instrumental coping *and* social support scores at or below the 25th percentile were identified (see Table 10). Originally, the intent was to use regression analysis to explore the relationship between instrumental coping, social support, and adherence among this subsample of individuals. However, as can be seen

from Table 10, the number of participants at or below the 25th percentile on both instrumental coping and social support for Time 2-5 ranged from 0 to 5 individuals. Given the small number of participants available, it was not considered appropriate to proceed with the regression analysis.

Table 10. Criterion Scores for Participants At or Below 25th Percentile on Instrumental and Social Support Measures.

Time	Variable	Mean	Median	25th Percentile	Eligible Subjects
Time 2	Instru. Coping	27.2	28.0	24.0	5
	Social Support	196.7	188.0	164.8	
Time 3	Instru. Coping	24.3	24.0	20.8	3
	Social Support	200.6	198	159.3	
Time 4	Instru. Coping	23.2	22.0	20.0	3
	Social Support	200.7	204.0	155.3	
Time 5	Instru. Coping	23.6	22.0	19.75	0
	Social Support	200.5	203.0	161.0	

Although it was not considered appropriate to conduct the above mentioned regression analysis, to further explore any potential influence of the combined effects of low instrumental coping and social support on adherence, descriptive statistics were calculated and visually examined. Specifically, the adherence levels of those individuals identified as meeting the above mentioned criteria were compared to the remainder of the sample for Times 2-4. At Time 5 no individuals met the criteria of being at or below the 25th percentile on both the instrumental and social support variable.

The relevant descriptive statistics are summarized in Table 11. In general, inspection of Table 11 does not suggest that the individuals low in

the use of instrumental coping and social support had lower mean levels of adherence compared to the remainder of the sample. The exception to this pattern appears to be at Time 4 at which time lower levels of adherence do seem to be apparent among these individuals. However, these observations should be viewed with caution due to the small number of individuals who met the established criteria.

Table 11. Mean Adherence Levels for Participants At or Below 25th Percentile on Instrumental Coping and Social Support Variables

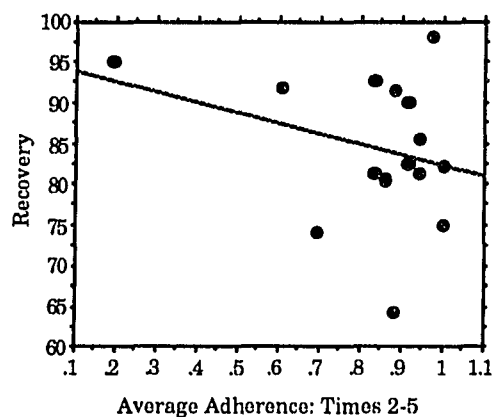
Assessment Period	Adherence Scores for Subsample Mean (SD) N	Adherence Scores for Remaining Participants Mean (SD) N
Time 2	.95 (.06) N=5	.89 (.19) N=20
Time 3	.78 (.29) N=3	.75 (.26) N=22
Time 4	.63 (.46) N=3	.83 (.30) N=22
Time 5	N=0	N=25

Phase V-Relationship Between Adherence and Recovery

The fifth and final purpose of this investigation was to examine the relationship between adherence and physical recovery. A correlation coefficient of $-.29$ was obtained between overall adherence levels and recovery. It was hypothesized that the correlation between adherence and recovery would be positive, thus, the negative relationship between adherence and recovery was unexpected.

Figure 13 illustrates the relationship between adherence and recovery. Examination of Figure 13 indicates the presence of two individuals who might be considered outliers. One individual (shown on the top left part of Figure 13) had an attendance ratio of .20 yet regained approximately 95% of his muscle strength by the 12th week testing period. Follow-up discussions with this individual indicated that he did not do any rehabilitation on his own or at another clinic. It can be noted that this individual was somewhat younger (17 years old) than the average age of participants in this study (26.2). The second possible outlier (shown on the bottom right of Figure 13) had an average attendance ratio of approximately .90 but recovered only approximately 65% of her strength. It can be noted that this individual was somewhat older (37 years old) than the average age of participants in this study.

Figure 13. Relationship Between Adherence and Recovery



CHAPTER IV

DISCUSSION

The major findings relative to the five purposes of this study are discussed in this section. In addition, the strengths and limitations of the investigation and proposed recommendations for future research are forwarded.

Purpose I-Descriptive Findings

The first purpose of this investigation was to describe the demographic, psychosocial, and behavioral characteristics of the sample. Interestingly, although there has been a growing interest sport injuries, little normative data are available regarding the psychological and behavioral reactions of athletes to injuries and much of the psychologically based injury literature has relied on elite or collegiate samples (e.g., Duda et al., 1989; Flint, 1993; Leddy, Lambert, & Ogles, 1994; McDonald & Hardy, 1990). Thus, the descriptive data from this group of injured recreational athletes were compared to data from other relevant samples in those instances where this information is available.

Demographics and Sport Participation Data

This sample of 25 individuals consisted of both male and female athletes who experienced ACL injuries while participating in a variety of activities. Taken as a whole, participants in this study could be described as “recreational” athletes. On average, participants were involved with sport related activities 9-10 hours per week. Although sport involvement was not

enormously time consuming for these individuals, being physically active and making full recovery from surgery were rated as being moderately to highly important. Additionally, individuals' athletic identity scores were in the moderate range suggesting that participants tended to view themselves, and perceive that others viewed them, as athletes.

Mood Disturbance

Participants' average mood disturbances from their Pre-Surgery assessments were compared to the mood disturbances reported elsewhere. Specifically, the average mood disturbances in this sample were similar to those reported among a sample of cancer patients seeking treatment for pain management (Shacham, 1983). Moreover, the mood disturbances among this sample were approximately equivalent to those reported by competitive athletes (varsity high school, collegiate, and minor league athletes) who were assessed following being injured (Smith et al., 1993). The finding that mood disturbances in this sample were comparable to those experienced by competitive athletes is important because anecdotal evidence has suggested that competitive athletes would experience greater mood disturbances than recreational athletes (due to having more of their identity and perhaps their livelihood dependent upon sport involvement). However, the empirical data from this investigation do not support such a conclusion.

Coping

Four types of coping were assessed through the CHIP-instrumental, negative emotion, distraction, and palliative coping. Examination of the means of each type of coping (see Table 9) revealed that instrumental coping

was the most used strategy throughout the course of the investigation and palliative coping was the least used. The finding that instrumental coping tended to be the prevailing coping strategy can be compared to data reported by Endler and colleagues (in press). Endler et al. distributed the CHIP to individuals who faced either acute or chronic health stressors and found that, regardless of the type of stressor, instrumental coping was used more than the three other forms of coping assessed on the CHIP. However, individuals experiencing chronic stressors tend to make use of instrumental coping more than individuals who face acute stressors. Endler and colleagues speculate that these differences may be because individuals who experience chronic health problems are more likely to have regular contact with health professionals and be involved in structured treatment programs. It can be recalled that some of the items on the instrumental coping subscale describe interactions with health professionals (e.g., "I try my best to follow my doctor's advice"); thus, individuals with chronic health problems may have more opportunities to make use of instrumental coping than individuals with acute health problems. Similarly, since the individuals in this study were involved in knee rehabilitation programs overseen by various sports medicine personnel, this may have accounted for greater use of instrumental coping compared to the other forms of coping.

The finding that palliative coping was the least used coping strategy contrasts data provided by Endler et al. who have reported that, in the main, palliative coping tends to be the second most preferred coping strategy among samples that have included adults, college students, and medical

patients. It is unclear what factors may have contributed to the differences observed in this sample compared to other samples regarding the use of palliative coping.

Social Support

This group of individuals perceived relatively high levels of social support as compared to college aged samples (Brown et al., 1988; Petrie, 1993). In fact, even when participants' perceived satisfaction with their social resources was at its lowest point (during the 3 weeks following surgery), social support levels continued to be above average as compared to college-age samples. The higher levels of social support noted among participants in this investigation may have been because, on average, these participants were older than college aged and tended to live at home with other family members.

Adherence

On average, participants in this investigation demonstrated relatively high levels of adherence. Specifically, mean adherence levels were comparable to those reported by Duda and colleagues (1989) among a group of university athletes who had experienced a variety of injuries. That adherence levels from this group paralleled those among a sample of university athletes was somewhat surprising given that most participants in this investigation were involved in sports on a more unstructured recreational basis. Alternatively, the relatively high levels of adherence observed in this sample may have been a function of participants' perceived severity of their injuries. That is to say participants may have been afraid of the physiological implications of not attending their rehabilitation sessions.

The overall high attendance rates that were demonstrated among participants in this sample bring up several points worth mentioning. First, the finding that overall rehabilitation rates were not especially low is important because other researchers have suggested that noncompliance among injured athlete samples is a significant problem (e.g., Fisher et al., 1988). Nonetheless, inspection of the frequency distribution for adherence levels from this sample (see Figure 4) revealed that three participants had alarmingly low levels of attendance i.e., attended fewer than 40% of their recommended sessions. Furthermore, it can be noted that those individuals who discontinued participation in this investigation (N=6) also appeared to have lower levels of adherence (see Table 2). Taken together these points suggest it may be appropriate to reformulate how we think about adherence. Perhaps rather than making statements such as "nonadherence to rehabilitation protocols is a significant problem" it would be more accurate to say that "nonadherence is a problem for a significant minority of individuals who may be difficult to reach."

Recovery

In general, individuals who underwent their strength recovery tests recovered well from their knee surgeries. Typically, it is anticipated that patients will recover 70-90% of their strength by the 12th post-surgery; participants in this investigation had recovered, on average, 85% of their strength by the 12th week following surgery.

Although relatively high levels of recovery were achieved by participants in this investigation, a cautionary note is in order when examining the recovery data. First, it is possible there was a selection bias

operating such that those individuals who were “on track” toward making a full recovery were more likely to be able to undergo their physical recovery test at the 12th week following surgery. Additionally, recovery data were only available for 60% of the participants due to circumstances beyond the investigator’s control (e.g., participants not being available at approximately the 12th post-surgery for a recovery test, participants discontinuing their rehabilitation program before the 12th week, participants not conducting their rehabilitation at the same clinic where they had surgery and therefore not having access to the same recovery tests). The difficulties associated with obtaining recovery data from participants following ACL surgery is a significant practical consideration that needs to be considered when undertaking future research of this nature.

Purpose II-Time Changes

The second purpose of this study was to examine whether there were significant changes in the psychosocial variables of interest over the course of participants’ rehabilitation. This section discusses the findings relative to time changes in mood disturbance, coping, social support, and adherence.

Mood Disturbance

Significant time changes in mood disturbances were observed over the course of the 12 week assessment period. In particular, mood disturbances were highest during the three weeks following surgery and decreased significantly from Time 2 to Time 4. There were minimal differences between mood disturbances at Time 4 and Time 5.

The trend for mood disturbances to decline over the course of rehabilitation appears to be one of the most consistent findings among the athletic injury literature (Leddy et al., 1994; Smith et al., 1990; Wiese-Bjornstal, Smith, & LaMott, 1995) and has also been noted in the medical literature among patients recovering from myocardial infarctions (Oldridge, Streiner, Hoffman, & Guyatt, 1995). The finding that mood disturbances were particularly intense during the first three weeks following surgery parallels finding reported by Smith and colleagues (Smith et al., 1990). These researchers found that negative affect in a group of seriously injured runners lasted approximately 1 month. These findings are important because knowing that the several weeks following ACL surgery is associated with the greatest mood disturbances may allow practitioners to streamline intervention efforts by targeting this specific window of time.

The data from this investigation provide insights into the mood responses of athletes who have all experienced the same type of relatively severe injury. Examining the reactions of injured athletes is not a new line of research but a shortcoming of some of the research has been that the severity of injury is not always taken into account. For instance, one study examining the emotional reactions of athletes to injuries defined an injury simply as physiological damage or body pain that required medical attention and which caused an athlete to miss a practice or competition for one or more days (e.g., Leddy et al., 1994). The casting of such a "wide net" when defining injuries consequently includes individuals who have experienced mild sprains as well as severe or permanently disabling

injuries and assumes such injuries are equivalent in their emotional impact. Smith and colleagues (1993) documented the relevance of considering mood disturbances in relation to injury severity. These investigators found that injury severity was the most reliable predictor of mood disturbances following injuries; variables that were not found to be significant predictors of mood disturbances included gender, age, level of participation, previous injury history and pre-injury self-esteem.

Coping

The extent to which the use of 4 types of coping (instrumental, negative emotion, distraction, and palliative) changed over time was examined through a series of repeated measures analyses. These analyses indicated that there were significant changes in instrumental, negative emotion, and palliative coping with effect sizes ranging from .13 to .22. No significant time differences were observed for the use of distraction coping and this variable was only associated with an effect size of 1%.

Perhaps more informative than the results of the individual statistical tests of significance, were the overall patterns of coping that emerged. Changes in instrumental, negative emotion, and palliative coping followed remarkably similar patterns across time (see Figure 9). In particular, the use of these coping strategies tended to show modest increases from Time 1 to Time 2, significant decreases from Time 2 to Time 4, and remain relatively stable between Time 4 and Time 5. In contrast, the use of distraction coping showed only minimal fluctuations across the five assessment periods. These trends in the use of coping strategies provide numerous points that bear mentioning.

First, it can be noted that the use of all coping strategies was highest at Time 2 i.e., during the 3-week period following surgery. It can be recalled that "coping" refers to cognitive and/or behavioral efforts to manage (master, reduce, or tolerate) a troubled person-environment relationship (Folkman & Lazarus, 1985). Such a definition of coping implies that, to the extent there is an increase in stress levels, there would be a concomitant increase in the use of coping strategies. Indeed Madden, Summer and Brown (1990) found that athletes who reported low levels of stress also reported less frequent use of coping strategies as compared to athletes who reported high levels of competitive stress. Judging from the increased use of coping strategies (and elevated negative mood states) at Time 2, it would be concluded that individuals perceived the most injury related stress during the three weeks Post-Surgery. This finding is not surprising given the pain, decreased mobility, loss in independence, and isolation that frequently follow on the heels of major surgery.

Another observation that can be made regarding the overall coping strategies is that there was little evidence that participants adopted a unidimensional approach to coping whereby they used only one strategy at any given time. This finding is consistent with the work of Folkman and Lazarus (1980) who examined the coping strategies used by middle-aged adults in responding to over 1000 stressful episodes; it was found that 98% of the encounters were handled by a combination of problem-focused and emotion-focused coping responses. Therefore, this study supports the conclusion that individuals respond to stress using a varied arsenal of coping strategies. However, this study extends the previous coping

literature in that it provides a sense of the specific types of coping strategies used by athletes who are were dealing with the same relatively severe health stressor.

Although individuals employed multiple coping strategies to deal with the stress stemming from their injuries, they consistently used instrumental coping more than other forms of coping. This finding was somewhat unexpected as it was hypothesized that negative emotion coping would be the most prevalent strategy used immediately following surgery with instrumental coping being the dominant strategy used in the later stages of recovery.

While the finding that instrumental coping was the most prevalent coping strategy used was unexpected, it is consonant with findings reported elsewhere in the coping literature (Endler et al., in press). Endler and colleagues have also reported that instrumental coping was the most common coping strategy used by individuals seeking medical treatment for both acute and chronic medical problems (see Figure 3). However, Endler and colleagues' work was generated from cross-sectional data gathered at the time participants sought medical assistance. Thus, their work does not provide any information regarding whether instrumental coping was the most used strategy across time or simply the most used strategy when patients sought medical treatment. It may be that before seeking medical attention, participants used less instrumental coping and more negative emotion, distraction, and palliative coping strategies. Indeed, seeking medical attention may serve as a marker that individuals have shifted to using more instrumental coping. Similarly, individuals in this

investigation were only tracked from the time they scheduled their surgery to 12 weeks post-surgery. However, since participants were not tracked from the initial time of their injury, it is not possible to know what coping strategies they used before scheduling their surgery. Perhaps the decision to schedule surgery coincides with the emergence of instrumental coping as the dominant coping strategy.

While instrumental coping was the most used coping strategy, palliative coping was the least used strategy, although the overall pattern of its use, as mentioned previously, was similar that of instrumental and negative emotion coping. Distraction coping was the second most used coping strategy, although the use of this particular strategy remained relatively stable over time. It is unclear why the use of distraction coping was less variable than the other forms of coping.

The findings from this investigation can also be examined in light of an issue that has been debated considerably in the coping literature, namely, to what extent is the use of coping strategies stable across time. Interestingly, it would appear that the data from this investigation seem to support both the “stable” and the “dynamic” views of coping, depending on what aspect of the data is focused on. On the one hand, significant time changes were observed in the use of several of the coping strategies—a finding that supports a dynamic view of coping. The observed changes in the use of coping over time are consistent with the work of Folkman and Lazarus (1985) and Bouffard and Crocker (1992). Both of these investigative teams concluded that the use of coping strategies is, in part, explained by the context or situational factors.

Alternatively, certain aspects of the data support the notion that the use of coping strategies remains relatively stable. Specifically, while significant time effects were observed, these effects would be considered small by conventional estimates of effect size (Cohen, 1992); thus, the amount of variance explained by time changes was limited. It can also be noted that, while there were changes in the *absolute* levels of coping, the *relative* levels of coping were more stable. For instance, as was previously mentioned, regardless of the assessment period, instrumental coping was the most used coping strategy and palliative coping was the least used strategy. The fact that most used and least used strategies were consistent over time tends to support the argument that coping strategies remain stable over time.

In the end, perhaps the issue of the extent to which coping is dynamic or stable is better understood when the specific stressors that individuals are dealing with are considered. Folkman and Lazarus reported (1985) changes in the use of coping strategies over time, but this study focused on the strategies used by college students at three different times surrounding a midterm examination period: the anticipation period before the exam, the waiting period after the exam but before grades were posted, and the follow-up period after grades were posted. Folkman and Lazarus found that problem-focused coping was more salient during the anticipation phase, and distancing more prominent during the follow-up period. Presumably the difference in students' choice of strategies was a function of the degree to which the stressor was viewed as amenable to being changed. That is to say, before taking the exam, students perceived

there was something they could do to deal with the examination stress so they adopted a problem-focused approach. However, once the exam was over, a problem-focused approach was no longer perceived as useful as other coping strategies such as distancing. Thus, in this situation, the perceived stressor changed, which resulted in a corresponding shift in the use of coping strategies. In contrast, perhaps the reason instrumental (problem-focused) coping continued to be the most used coping strategy in this investigation was because participants continued to appraise their injury as a stressor that was amenable to instrumental coping efforts and therefore continued to make the most use of this strategy.

To conclude, in response to the question, "How did individuals cope with their injuries?" the reply in the most simplistic of terms, might be "they did more of everything" during the first three weeks Post-Surgery i.e., participants increased their use of all forms of coping. Over time, as the stress of surgery and their injury diminished, participants responded by "doing less of everything." Contrary to predictions, coping responses did not follow complex patterns of shifting from negative emotion coping to instrumental coping. Instead, participants consistently relied on instrumental coping the most and palliative coping the least, regardless of the assessment period.

Establishing an empirical base regarding the coping patterns used by injured athletes is important when one considers that numerous sport science researchers have discussed the presumed importance of coping when considering athletic injuries (Anderson & Williams, 1988; Gordon, Milios, & Grove, 1991). However, there has been a dearth of research

regarding what type of coping strategies athletes use to deal with their injuries and whether these patterns change over time. These results provide some initial insight into these areas.

Social Support

The statistical procedures used to examine potential changes in social support resulted in nonsignificant time effects. However, examination of the overall trends relative to time changes in social support indicated that perceived satisfaction with social support decreased from Time 1 to its lowest point at Time 2. From Time 2 through Time 5 social support levels increased but still remained below their Time 1 levels.

Potential changes in social support levels seem worthy of additional research efforts, given that the data suggest that, even among a sample of individuals who had high levels of social support individuals were the least satisfied with their social resources in the three week period following their surgery. It has yet to be determined if social support levels would be more susceptible to temporal fluctuations among a group of individuals who were not fortunate enough to have the same level of social resources as were found among this group of individuals.

Adherence

The examination of changes in adherence over time was included as an exploratory component of this investigation. Data analysis revealed significant time changes in adherence. Interestingly, the overall pattern of adherence was similar to the observed changes in mood disturbances and the use of coping strategies. That is to say, adherence was highest during Time 2 and showed a significant decrease from Time 2 to Time 3, and

remained relatively stable from Time 3-5. The finding that adherence levels changed significantly over time is consistent with the work of Meichenbaum and Turk (1987) who have argued that adherence is best viewed as a process susceptible to fluctuations. Drawing from the work and Meichenbaum and Turk, Wiese-Bjornstal and colleagues (1995) have noted that because an athlete adheres to his/her rehabilitation protocol at one time does not ensure that the individual will adhere to the program at a later time. Thus, from a practical perspective, adherence needs to be assessed and facilitated throughout the injury rehabilitation progress, particularly when the rehabilitation period is prolonged.

The finding that adherence levels changed over time raises the question of why adherence levels would have been highest during Time 2. One possible explanation may be that individuals used various signals of discomfort resulting from their surgery (e.g., physical pain and mood disturbances) as a cue for the need to rehabilitate i.e., the feedback they were receiving was an indication of the severity of their injury that, in turn, induced them to attend rehabilitation sessions. Over time, as the intensity of these feedback cues diminished, participants' perception of the need to attend rehabilitation may have subsided. This may be similar to the observation in the exercise literature that some patients with risk factors for heart conditions will continue to exercise as long as they feel bad; but, once they begin to feel better, it is harder to convince them of the necessity of continuing to exercise (Willis & Campbell, 1992).

Another explanation of why adherence levels were highest during Time 2 may simply have been related to economic considerations. During

the 10 month period that this investigation was conducted, there was mounting pressure from several Greensboro based managed care companies to limit the number of rehabilitation sessions that were covered for ACL surgery. For example, one major managed care company recently reduced their coverage for ACL surgery to 20 visits (which would translate into approximately 6-7 weeks of therapy). Thus, adherence levels may have tapered off due to financial considerations posed by changing insurance policies.

Purpose III-Relationship Between Psychosocial Variables, Rehabilitation Adherence, and Recovery

The third purpose of this investigation was to explore whether the psychosocial variables of mood, coping and social support were significant predictors of rehabilitation adherence and recovery. Separate analyses were conducted to examine whether these psychosocial variables were significant predictors of: (1) adherence, and (2) adherence and recovery.

Predictors of Rehabilitation Adherence

It was hypothesized that mood disturbances, negative emotion, and distraction coping would be negatively correlated with adherence, while instrumental coping and social support would be positively related to adherence. A series of stepwise regression analyses (Time 2-Time 5) was conducted to explore these hypotheses. There was no support for the prediction that these psychosocial variables constituted significant predictors of rehabilitation adherence. Instead, the regression analyses indicated that the most reliable predictor of adherence at Times 3-5 was adherence from the previous assessment period. There are several possible

explanations for why there was no support for the prediction that the psychosocial variables of interest would be significant predictors of adherence.

First, clearly, the issue of statistical power may have contributed to the lack of predictive capabilities. Ideally, it is recommended that multiple regression analysis have a *minimum* subject-to-variable ratio of 5:1 (Tabachnick & Fidell, 1989). Thus, in this investigation, with 6 independent variables (mood, social support, instrumental, negative emotion, distraction, and palliative coping) it would be recommended that the sample include at least 30 individuals. Despite extensive efforts to obtain as many participants as possible, this sample only included 25 individuals which is less than minimum recommended number of participants for achieving adequate statistical power.

A second reason for the nonsignificant relationships between the psychosocial variables and adherence may have stemmed from measurement issues— an issue that may be particularly relevant with respect to social support. Within the sport science literature, Fisher et al. (1988) and Duda et al. (1989) found social support to be related to rehabilitation adherence among injured athlete populations. Interestingly, both of these studies measured social support as it pertained to support for athletic participation and/or support for rehabilitation. (Unfortunately, little psychometric information was reported on the measures of social support that were used in either of these studies.) In contrast, the SSI-SS, which was the social support measure used in this investigation, assesses social support more globally i.e., not in reference to social support for the specific

task of attending rehabilitation. Future researchers examining social support as it relates to rehabilitation may want to consider including social support measures that tap respondents' perceived social support for rehabilitation. As King and associates (1993) have noted there may be a need to identify the specific types of support that is helpful in given situations. In summary, measurement issues need to be considered as a potential explanation for the lack of significance.

A third explanation may be that mood disturbances, coping, and social support are simply not the most salient variables for predicting rehabilitation adherence among injured athletes. For instance, among cardiac patients it has been found that individuals who discontinued rehabilitation efforts were higher in depression and anxiety than those who continued participating (Blumenthal et al., 1982); however, these results were not replicated among this group of injured athletes. What allowed individuals in the current investigation to demonstrate high levels of adherence despite elevated mood disturbances? To borrow a phrase, perhaps most participants found a way "to just do it" (i.e., overcome mood disturbances) and attend their rehabilitation sessions because sport participation was relatively important to them. Perhaps among injured athlete populations variables such as the perceived importance of sport would prove to be more salient predictors of adherence than mood, coping or social support. Alternatively, it may have been that the mood disturbances and stress experienced by the individuals in this sample, while elevated at Time 2, were not severe enough to impair their ability to attend their rehabilitation sessions.

To conclude, a variety of factors may have contributed to the finding that mood disturbances, coping, and social support were not significant predictors of rehabilitation. These include issues related to statistical power, measurement, and the relevance of these variables to rehabilitation adherence. Strong statements regarding which of these explanations are most plausible do not seem warranted at this time. Logically, it would seem judicious to first proceed by testing the relationships again using a larger sample and modifying some of the assessment tools (e.g., assess social support specifically as support for rehabilitation). Having the benefit of the information gleaned from these changes would allow for more informed conclusions regarding what variables constitute reliable predictors of rehabilitation adherence.

Combined Relationship Between Psychosocial Variables, Adherence and Recovery

To reiterate, it was originally hoped that if enough individuals were injured (i.e., there were more individuals than the original projection of having 30 participants included in the study), the available participant pool would be large enough to conduct data analysis examining psychosocial predictors of *both* adherence and recovery as outcome variables. This analysis was to be performed using canonical correlation. However, when using canonical correlation in the social sciences, it is suggested that 10 participants be used for every variable (Tabachnick & Fidell, 1989). Given the large discrepancy between these guidelines and the number of participants available from this sample, it was not considered appropriate to conduct this portion of the data analysis.

Purpose IV-Interaction Between Coping and Social Support, and Adherence

The fourth purpose of this investigation was to examine interactions between coping, social support, and rehabilitation adherence. First, individuals who were low *both* in the use of instrumental coping *and* low social support (defined as at or below the 25th percentile) were identified. Using this subsample of participants, the goal was to examine the relationship between coping, social support, and adherence.

Originally, it was anticipated that data analysis relative to this purpose would be undertaken using regression analysis. However, a maximum of 5 individuals met the criteria of being at or below the 25th percentile for both the use of instrumental coping and social support. For this reason, regression analysis was not used. Instead, descriptive statistics were calculated and visually inspected. Specifically, adherence levels of individuals who reported using low amounts of instrumental coping and low social support were compared to the remainder of the sample for Times 2-4 (no individual met the established criteria during Time 5). Overall, there did not seem to be support for the notion that individuals low in the use of instrumental coping and social support had lower mean levels of adherence compared to the remainder of the sample. One exception to this was at Time 4, at which time the combination of low instrumental coping and social support did seem to be related to lower levels of adherence. However, these conclusions should be viewed very cautiously due to the limited number of individuals who meet the criteria

for exploring these relationships. It is estimated that a subject pool of 125 or more subjects may be needed to adequately explore these relationships.

Purpose V-Relationship Between Adherence and Recovery

The fifth and final purpose of this study was to examine the relationship between rehabilitation adherence and recovery. A small negative correlation (-.29) was observed between adherence and recovery, which was an unexpected finding. There are several possible explanations for the observed negative relationship between adherence and recovery.

First, it may be that the rehabilitation protocol being used by the cooperating sports medicine clinic is not optimal for facilitating recovery. Interestingly, *inverse* relationships between ACL patients' adherence and recovery have been noted in the past. During the early 1980's, medical research revealed that ACL patients who were noncompliant with the accepted treatment protocol were actually returning to normal functioning *sooner* than those who complied with the prescribed regimen (cited in Shelbourne & Nitz, 1990; Shelbourne & Wilckens, 1990). Follow-up analysis indicated that the accepted practice of immobilizing ACL patients following surgery was actually retarding their recovery. Because of these findings, the standard rehabilitation procedures were revamped to encourage patients to be more active following their surgery-a protocol now referred to as an "accelerated program." While the sports medicine clinic that participated in this investigation currently uses a modified version of the accelerated program, there may be aspects of the protocol that need to be adjusted to improve the relationship between adherence and recovery.

Second, it may be that individual variability in recovery rates resulted in the observed relationship between adherence and recovery. Individual differences in the amount of scar tissue buildup and swelling are factors known to impact recovery rates independent of adherence rates (Shelbourne & Nitz, 1990; Shelbourne & Wilckens, 1990), although these individual differences would not seem to be dramatic enough to result in a negative relationship between adherence and recovery.

Related to the above, participants' age may have had an impact on the observed relationship between adherence and recovery. Specifically, within this data set two individuals appeared to be outliers. One individual (17 years old) demonstrated very low adherence rates yet had a surprisingly high recovery rate. This individual was more than one standard deviation below the mean age of the rest of the participants. Conversely, a second individual (37 years old) had above average adherence rates but below average recovery rates. This individual was more than one standard deviation above the mean age of the rest of the participants. The data from these two outliers suggest that future investigators who choose to measure recovery rates (as it was measured in this investigation) may want to control for the effects of age.

In summary, there are several plausible explanations for the observed relationship between adherence and recovery. To more thoroughly explore this relationship it would be advantageous to have a larger participant pool where the researcher could control for variables such as age. In the meantime, the data from this investigation suggest that researchers acknowledge the relationship between these adherence and

recovery is more complex than might be assumed based on intuitive assessments.

General Summary

The first purpose of this investigation was to describe the demographic, psychosocial, and behavioral characteristics of the present sample and to compare this information to data obtained from other samples. To summarize, although participants in this investigation could be described as recreational athletes, they experienced mood disturbances similar to those reported among more elite samples. In addition, participants apparently enjoyed relatively high levels of social support as compared to other athlete samples. Participants were also similar to other samples of individuals facing health stressors in that instrumental coping was the most used coping strategy. Finally, participants demonstrated relatively high levels of rehabilitation adherence and recovery.

A second purpose of this investigation was to examine potential time changes in the various psychosocial variables of interest. This study started from the theoretical perspective that a relatively major injury would act as a stressor, and as such, would possess the ability to upset or perturb the psychosocial system in which it occurred. Thus, a repeated measures design was used to gain an understanding of how susceptible to fluctuations a variety of psychosocial factors were during participants' recovery from their injuries. As Folkman and Lazarus (1984) have noted the benefit of such a design is that "...we are no longer looking at a still photo, a single act or thought pictured in a discrete time frame, but a series of stills, joined to form a continuous motion picture that portrays the actual

flow of events" (p. 287). The data indicated that some variables were more labile than others. Time changes were apparent in mood disturbances, instrumental coping, negative emotion, palliative coping, and adherence. Alternatively, the use of distraction coping and social support remained more stable over time.

A third purpose of this investigation was to examine whether mood disturbances, coping, and social support, were significant predictors of rehabilitation adherence and recovery. Although none of psychosocial variables proved to be "statistically significant" predictors of adherence (at any of four times that adherence was measured), these findings are nonetheless interesting, especially when examined in light of the data regarding time changes in the various psychosocial and adherence variables. It can be recalled that analysis of the time changes in adherence levels indicated that adherence was highest during the early phases of recovery. Moreover, analysis of time changes in the various psychosocial variables clearly indicated that early of stages of recovery were the most difficult for individuals (as evidenced by increases in mood disturbances and the use of all forms of coping and decreases in social support). Thus, adherence levels were highest when stress levels were highest. These findings are important because they show that athletes adhered to their rehabilitation programs *in spite of* difficulties they faced during the early phases of recovery. Stated differently, just because athletes get "stressed out" by their injuries does not necessarily place them at risk for nonadherence.

A fourth purpose of this study was to examine whether a subgroup of individuals, who were low both in the use of instrumental coping and in social support were at an increased risk for nonadherence. The utility of considering subgroups of individuals has been demonstrated by several researchers (e.g., Petrie, 1993; Smith et al., 1990). However, a prerequisite of this type of analysis is that the participant pool is large enough to provide a sufficient number of individuals who meet the established criteria for being in a subgroup. In this instance, the identification of an adequate number of individuals who were both low in instrumental coping and social support was problematic.

Strengths and Limitations of the Investigation

As with every investigation there were both strengths and limitations to this study. The primary strengths of this study are two fold. One strength of this investigation was its relatively high ecological validity. As was noted earlier, some 17 million injuries occur each year as a result of individuals' participation in sports or some form of physical activity (Booth, 1987). Thus, sports related injuries constitute a very "real world" stressor for a large number of individuals. This study provided a glimpse of the psychological process and behavioral reactions of individuals who were not responding to hypothetical or contrived laboratory stressors, but to a significant health stressor. For these reasons, the results from this study are thought to have high external validity.

A second strength of this study is that injury status was held constant. Although including only athletes who experienced ACL injuries resulted in small sample size (a limitation of the study that will be

discussed presently), it was also thought the inclusion of individuals who all experienced the same injury provided a “sharp image” of how athletes responded to an acute and relatively severe injury. All the athletes in this study had to cope with the pain associated with surgery, a temporary loss of mobility, and the prospect of attending rehabilitation for several months (although not all individuals chose to do the latter). In contrast, minor injuries such as sprained ankles, typically do not involve surgery or significant losses in mobility. Thus, the emotional reactions and the coping patterns employed to deal with injuries may vary considerably depending on the nature and severity of the injury. For this reason, controlling for injury status was considered a strength of this study.

As noted above, an obvious limitation of this study was the small sample size—a limitation that is inextricably tied to issues of statistical power. The small number of participants was not considered especially problematic in determining descriptive statistics for the sample (Purpose I) or examining time changes in the psychosocial variables of interest (Purpose II). Indeed a power analysis conducted regarding time changes in the various psychosocial variables (Purpose II) provided power estimates ranging from .80 to .90. However, the small sample was an undeniable limitation when trying to conduct the various analyses that were concerned with predicting adherence and recovery (Purposes III-V). As a consequence, the results from these analyses must be interpreted with caution.

Recommendations for Future Research

Throughout this discussion an attempt has been made to offer suggestions for future research. However, before closing it seems appropriate to revisit the major issues that have been raised from this investigation with the goal of using this information to generate recommendations for future research.

First, the data gleaned from examining time changes in mood, coping, and social support strongly suggest that it is the first 3 weeks following ACL surgery are the most difficult for individuals. Given the levels of distress experienced during the 3 weeks post-surgery, the question then becomes whether intervention efforts can effectively ameliorate the stress associated with this time. Specifically, can pre-surgery interventions be used to prepare individuals for what they may experience for the first several weeks post-surgery? Or are post-surgery intervention efforts more efficacious? What are the active ingredients of effective interventions i.e., can other injured athletes who have successfully overcome their injuries be used as models (e.g., via video technology) or must an individual also have the opportunity to discuss the negative affective states she/he is experiencing? These types of questions can only be answered if they receive the attention of future investigators.

Second, the results from this study provided information regarding the coping preferences of participants and changes in the use of coping from the time individuals scheduled their surgery until 12 weeks after their surgery. However, it is not known what types of coping strategies had been used before participants scheduling their surgery. Is the decision to

schedule surgery a marker that individuals have shifted from using other forms of coping (negative emotion or palliative coping)? Research designs that allow investigators to begin assessing participants' use of coping strategies from the time they are initially are injured (or even before injured) could be used to examine such questions.

A third area that deserves the attention of future research efforts relates to increasing our understanding of rehabilitation adherence issues. Although overall adherence levels among this sample were relatively high, several individuals demonstrated very low levels of adherence. Moreover, there was some evidence that those individuals who dropped out of study were at greater risk for nonadherence. Unfortunately, none of the psychosocial variables assessed in this study were reliable predictors of who was at risk for nonadherence. Thus, it is clear we need to need to more specifically identify the psychosocial (e.g., hardiness, perceived control) and/or demographic characteristics of individuals who are at risk for nonadherence to their rehabilitation efforts. Using qualitative methodology may be a useful in providing more in-depth information about the perspectives of individuals who demonstrated low adherence levels.

While the small sample may have attributed to the lack of variables measured in this study to predict adherence, it may also be appropriate to look at adherence from a somewhat different perspective. It is suggested that examining the work of Marcus and colleagues (Marcus, Rakowski, & Rossi, 1992; Marcus, Rossi, Selby, Niaura, & Abrams, 1992; Marcus, Selby, Niaura, & Rossi, 1992) may be useful in improving our understanding of adherence related issues. Drawing from the work of Prochaska and

DiClemente (1983), Marcus and colleagues have applied what is referred to as the transtheoretical model to examine exercise adherence. This research has shown that individuals considering undertaking a new health behavior (e.g., exercise) view the costs and benefits associated with the behavior differently than individuals who have been successful in maintaining the same behavior. Specifically, regular exercisers tend to perceive the benefits of exercise (e.g., more energy) as more salient than the costs (e.g., feels uncomfortable). Similarly, perhaps the few individuals who demonstrated very low rehabilitation adherence rates in this study found the costs (e.g., inconvenience, work conflicts) of attending rehabilitation greater than the benefits. If this is so, some individuals may be better off delaying their surgery until they have moved to stage of readiness where the benefits are viewed as more salient than the costs. However, at this point such speculations are merely that, speculations. These are all issues awaiting empirical testing.

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APPENDIX A

MEDICAL INFORMATION ON ACL SURGERY

In some instances when the ACL is damaged there is also damage to the meniscus of the knee. This additional damage may take one of two forms. The first type of damage involves minor damage to the meniscus of the knee and is repaired through a surgical procedure referred to as a partial meniscus resection. This procedure is so minor that it is not thought to change to the rehabilitation protocol or the expected recovery rate from an ACL repair. The second type of repair, somewhat more serious, but less common, is repaired through a procedure referred to as meniscal repair. Because the meniscal repair tends to add a small but significant amount of time to the recovery process, individuals who experience this type of injury will not be included in the statistical analysis of this investigation. Thus, only those individuals experiencing ACL repair and ACL accompanying partial meniscus resection will be included in this investigation. However, for the sake of the simplicity, both ACL and ACL partial meniscus resections will be referred to as ACL repairs throughout this discussion.

APPENDIX B
DEMOGRAPHIC ASSESSMENT

BACKGROUND INFORMATION

- 01 Name: _____ Date: _____
 Date of injury: _____ Date of surgery: _____
- 02 Age: _____ 03 Sex: (circle one) Male Female
- 04 What sports medicine clinic will you be attending for your rehabilitation (check one)?
 Murphy, Wainer Orthopedic Specialists _____
 Other (please specify) _____
- 05 How would you describe your current level of sport/ exercise participation (check one):
 Recreational _____ Collegiate _____
 High School _____ Not currently involved _____
- 06 What type of activity were you participating in at the time of your injury?
 Football _____ Racquetball _____
 Soccer _____ Basketball _____
 Work _____ Other (specify) _____
- 07 At what point in the competitive season did your injury occur?
 pre-season/conditioning _____ 3/4 through season _____
 early season _____ late season _____
 mid-season _____ between seasons _____
 3/4 through season _____ not applicable _____
- 08 How many **hours per week on average** do you spend training when you are "in season" for the sport or exercise program that you are most involved with?
 _____ Hours/week
- 09 Briefly describe how you were injured (e.g., collided with another player while playing soccer).
- 10 Have you ever had a previous major injury as a result of participating in a sport or exercise program (circle one)?
 Yes / No

- 11 If you answered "yes" to the above question, please provide details below.

type of Injury _____

date of injury _____

time out of sport _____

- 12 Have you ever had a non-sport illness or injury that severely limited your sport or exercise participation (circle one)?

Yes / No

- 13 If you answered "yes" to the above question, please provide details (type of injury or illness, when, amount of time you were unable to participate in sports, etc.).

type of Injury _____

date of injury _____

time out of sport _____

- 14 How important to you is it to participate in sports or exercise on a regular basis?

Not at all important
1

Somewhat
2

3

Extremely important
4 5

- 15 How important to you is it to make a full recovery from you surgery?

Not at all important
1

Somewhat
2

3

Extremely important
4 5

- 16 What is your main reason for choosing to undergo your current knee surgery (check one)?

to return to sports/exercise activities _____

to return to non-sport or exercise related activities _____

(e.g., work, walking up and down steps)

APPENDIX C

ATHLETIC IDENTITY MEASUREMENT SCALE

8. I feel bad about myself when I do poorly in sport.

Strongly
agree

Strongly
disagree

9. Sport is the only important thing in my life.

Strongly
agree

Strongly
disagree

10. I would be very depressed if I were injured and could not compete in sport.

Strongly
agree

Strongly
disagree

APPENDIX D

SHORTENED PROFILE OF MOOD STATES

This questionnaire asks about your feelings regarding your injury.

The words shown below describe different feelings and moods. Please read each word carefully and then **circle one number that best describes how you have been feeling during the past three weeks in regards to your injury** (since the last questionnaire).

Your first reactions will be the most reliable, so do not spend too long thinking about your response. Please be honest and circle the appropriate answer for each item.

FEELINGS ABOUT YOUR INJURY DURING THE PAST THREE WEEKS

	Not at all (0)	A little (1)	Moderately (2)	Quite a bit (3)	Extremely (4)
01 Tense	0	1	2	3	4
02 Angry	0	1	2	3	4
03 Worn Out	0	1	2	3	4
04 Unhappy	0	1	2	3	4
05 Lively	0	1	2	3	4
06 Confused	0	1	2	3	4
07 Peeved	0	1	2	3	4
08 Sad	0	1	2	3	4
09 Active	0	1	2	3	4
10 On edge	0	1	2	3	4
11 Grouchy	0	1	2	3	4
12 Blue	0	1	2	3	4
13 Energetic	0	1	2	3	4
14 Hopeless	0	1	2	3	4
15 Uneasy	0	1	2	3	4
16 Restless	0	1	2	3	4
17 Unable to Concentrate	0	1	2	3	4
18 Fatigued	0	1	2	3	4
19 Annoyed	0	1	2	3	4
20 Discouraged	0	1	2	3	4
21 Resentful	0	1	2	3	4
22 Nervous	0	1	2	3	4

		Not at all (0)	A little (1)	Moderately (2)	Quite a bit (3)	Extremely (4)
23	Miserable	0	1	2	3	4
24	Cheerful	0	1	2	3	4
25	Bitter	0	1	2	3	4
26	Exhausted	0	1	2	3	4
27	Anxious	0	1	2	3	4
28	Helpless	0	1	2	3	4
29	Weary	0	1	2	3	4
30	Bewildered	0	1	2	3	4
31	Furious	0	1	2	3	4
32	Full of Pep	0	1	2	3	4
33	Worthless	0	1	2	3	4
34	Forgetful	0	1	2	3	4
35	Vigorous	0	1	2	3	4
36	Uncertain about things	0	1	2	3	4
37	Bushed	0	1	2	3	4
38	How severe is your injury? (circle one)					
	Not at all		Somewhat		Extremely	
	1	2	3	4	5	
39	How much do you think that your injury recovery is something that you can do something about?					
	Not at all		Somewhat		Extremely	
	1	2	3	4	5	
40	How much do you think that your injury is something that you have to accept?					
	Not at all		Somewhat		Extremely	
	1	2	3	4	5	
41	How much do you think that your injury is something that you have to know more about before you can act?					
	Not at all	Somewhat		Extremely		
	1	2	3	4	5	
42	Have you experienced any setbacks in your injury rehabilitation in the last three weeks (e.g., falling off your crutches and reinjuring your knee)? If yes, please describe?					

APPENDIX E

COPING WITH HEALTH AND INJURY PROBLEMS SCALE

The following are ways of reacting to injuries. Please circle a number from 1 to 5 for each of the following items. Indicate how much you engaged in these types of activities as you dealt with your injury **during the last three weeks.**

Circle how much you engage in these activities.

	Not at all (1)	A little (2)	Moderately (3)	Quite a bit (4)	Very Much (5)
01 Think about the good times I've had.	1	2	3	4	5
02 Stay in bed.	1	2	3	4	5
03 Find out more information about my injury.	1	2	3	4	5
04 Wonder why it happened to me.	1	2	3	4	5
05 Be with other people.	1	2	3	4	5
06 Lie down when I feel tired.	1	2	3	4	5
07 Seek medical treatment as soon as possible.	1	2	3	4	5
08 Become angry because it happened to me.	1	2	3	4	5
09 Daydream about pleasant things.	1	2	3	4	5
10 Get plenty of sleep.	1	2	3	4	5
11 Concentrate on the goal of getting better.	1	2	3	4	5
12 Get frustrated.	1	2	3	4	5
13 Enjoy the attention of friends and family.	1	2	3	4	5
14 Try to use as little energy as possible.	1	2	3	4	5
15 Learn more about how my body works.	1	2	3	4	5
16 Feel anxious about the things I can't do.	1	2	3	4	5
17 Make plans for the future.	1	2	3	4	5
18 Make sure I am warmly dressed or covered.	1	2	3	4	5
19 Do what my doctor/physical therapist tells me.	1	2	3	4	5
20 Fantasize about all the things I could do if I was better.	1	2	3	4	5
21 Listen to music.	1	2	3	4	5
22 Make my surroundings as quiet as possible.	1	2	3	4	5
23 Try my best to follow my doctor's/physical therapist's advice.	1	2	3	4	5
24 Wish that the problem had never happened.	1	2	3	4	5
25 Invite people to visit me.	1	2	3	4	5
26 Be as quiet and still as I can.	1	2	3	4	5

	Not at all (1)	A little (2)	Moderately (3)	Quite a bit (4)	Very Much (5)
27				1 2 3 4 5	
28				1 2 3 4 5	
29				1 2 3 4 5	
30				1 2 3 4 5	
31				1 2 3 4 5	
32				1 2 3 4 5	

APPENDIX F
SOCIAL SUPPORT INVENTORY

OTHER PEOPLE

This questionnaire contains items describing types of help or support we often need or want from other people. For each item, please give ratings for **HOW SATISFIED** you have been with what you have received in terms of this type of support in **THE LAST THREE WEEKS**.

Indicate your responses using the following scale:

1	2	3	4	5	6	7
Not at all Satisfied			Fairly Satisfied			Very Satisfied

EXAMPLE: "Information about how others have handled situations similar to ones you may be experiencing".

1	2	3	4	5	6	7
Not at all Satisfied			Fairly Satisfied			Very Satisfied

	Item	Satisfaction
01	Encouragement to face reality, no matter how difficult.	_____
02	Information about how others have handled situations similar to ones you may be experiencing.	_____
03	Information about how others have felt when confronted by situations similar to ones you may be experiencing.	_____
04	A model or example for you to follow.	_____
05	Knowledge that others are comfortable and willing to talk with you about the good feelings you have about yourself.	_____
06	Knowledge that others are comfortable and willing to talk with you about your hopes and plans for the future.	_____
07	Financial support to deal with emergency situations.	_____
08	Nonfinancial aid or services to reestablish or maintain an acceptable standard of living.	_____
09	Reassurance that it is quite normal to feel down at this time of your life.	_____
10	Information and guidance about how to cope with difficult situations.	_____
11	Information and guidance about how to change negative feelings about yourself.	_____
12	Reassurance that it is okay to feel good about yourself even when things are not going well.	_____
13	Nonfinancial aid or service to deal with emergency situations.	_____

- 14 Assurance that you belong to a group of caring people. _____
- 15 Encouragement to talk about your feelings when you are feeling down and blue. _____
- 16 Information and guidance about how to change self-defeating attitudes or behaviors. _____
- 17 Assistance in realizing when you are thinking or acting in a self-defeating ways. _____
- 18 Assurance that you are loved and cared about. _____
- 19 Encouragement to talk about your future hopes and plans in a positive way. _____
- 20 Help to feel optimistic about your future. _____
- 21 Information on sources of financial assistance. _____
- 22 Reassurance that your fears and anxieties about the future are quite normal. _____
- 23 Help in seeing positive things about your life no matter how bad things are going. _____
- 24 Knowledge that others are comfortable and willing to talk with you about your feelings of insecurity or fear. _____
- 25 Information about how someone else handled situations similar to ones you may be experiencing. _____
- 26 Assurance that you are respected and valued no matter what is happening in your life. _____
- 27 Reassurance that it is not unusual to feel hopeful about your future even when things are not going well. _____
- 28 Information about services that might be helpful to you. _____
- 29 Reassurance that it is quite normal to feel down and blue when thinking about what's going on in your life. _____
- 30 Encouragement to talk about the good aspects of yourself and your life. _____
- 31 Assurance that you are needed by others. _____
- 32 Financial assistance to reestablish or maintain an acceptable standard of living. _____
- 33 Assurance that you are accepted no matter what is happening in your life. _____
- 34 Encouragement to talk about your fears and insecurities. _____
- 35 Knowledge that others are comfortable and willing to talk with you about the good things that are happening in your life. _____
- 36 Help and assistance in setting realistic goals for yourself. _____

- 37 Knowledge that others are comfortable and willing to talk about anything with you. _____
- 38 Help and assistance in your efforts to change self-defeating attitudes or behaviors. _____
- 39 Knowledge that others are comfortable and willing to talk with you when you are feeling down and blue. _____

Finally, please list below any other needs or wants that you have had in the **past three weeks** that have not been adequately met by others.

APPENDIX G
HUMAN CONSENT FORM

