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Injuries are common in collegiate sport, and most sport injury research has focused on the consequences of injuries for the individual athlete (e.g., stress, frustration, decreased confidence). Very little is known about how injury may impact the team. Recent data using actual injury and hypothetical injury scenarios show that injury impacts a team's collective efficacy (Damato et al., 2008; Edmonds et al., 2009). This research has focused on elite, primarily male samples, and has used sport-specific measures of collective efficacy making results difficult to generalize to other sport populations. The Collective Efficacy Questionnaire for Sports (CEQS; Short, Sullivan, & Feltz, 2005) was developed to eliminate this limitation and can be used to measure collective efficacy beliefs across sports. The purpose of this study was to examine how a team's collective efficacy might change as a result of a teammate's injury in collegiate athletes.

A sample of 17 intact NCAA Division I, II, and III intercollegiate soccer teams (9 women's, 8 men's) completed the Collective Efficacy Questionnaire for Sports (CEQS; Short, Sullivan, & Feltz, 2005) before and after being presented with a hypothetical scenario depicting the loss of a teammate due to injury. Results of a 3-level hierarchical linear model revealed a significant main effect for time ($p < .001$), indicating that team perceptions of collective efficacy decreased following the hypothetical injury of a team member. These findings support initial research that consequences of sport injury extend beyond the individual athlete and may affect team function. Findings also extend existing research with adults to include collegiate athlete populations of both genders.

Recognizing that injury can alter team efficacy suggests that athletes, coaches, and sports medicine staff may need to consider a broader psychosocial perspective of sport injury consequences.

THE EFFECT OF HYPOTHETICAL INJURY ON COLLECTIVE EFFICACY IN COLLEGIATE SOCCER TEAMS

by

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Approved by

_____
Committee Chair

To my husband Josh, for your inspiration, and encouragement throughout this long process.

APPROVAL PAGE

This thesis has been approved by the following committee of the Faculty of The Graduate School at The University of North Carolina at Greensboro.

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TABLE OF CONTENTS

Page

LIST OF TABLES

Page

CHAPTER I

INTRODUCTION

In March 2010, David Beckham, famous soccer player and former England National team captain, suffered a ruptured Achilles tendon during a competition ending his hopes for competing in a fourth World Cup that year. Newspapers showed pictures of Beckham, head in hands, tears in his eyes, dreams smashed. In light of the new injury and Beckham's definite absence from the World Cup squad, speculation ensued as to how the team would fare without him. Would the team's performance suffer as a result of the absence of their star? Does the loss of a player to injury impact the team's perceived abilities to perform optimally? If so, what is the nature of this relationship?

Injury is a particularly salient aspect of sports. For example, the NCAA Injury Surveillance Program Fall Sports Qualifying Report for 2004-2009 reported that over the 5-year period across 5 Fall sports, there were approximately 266,973 injuries in collegiate football and 79,858 in women's soccer. Although the number of reported injuries was greatest in football, women's soccer had higher injury incidence (10.9 vs. 10.5 in football per 1000 athlete exposures; Marshall & Corlette, 2009). In addition, the report indicated that Division I female soccer players were more likely to become injured than their Division II and III counterparts, and the total number of days lost due to injury was higher in women's soccer (13.2) than in men's soccer (7.8). Soccer (both men's and

women's) was in the top 3 fall sports for the highest incidence of injury (Marshall & Corlette, 2009).

In addition to the adverse effects that injuries have on physical functioning, they can also affect psychological functioning in terms of cognition, affect, and behavior. Research has focused on understanding the psychological and emotional responses of individuals to sport injury (Brewer, 2007). Injuries may be a major source of stress and emotional disturbance (Brewer & Petrie, 1995). Injured athletes experience feelings of depression, anxiety, loss, frustration, anger, isolation, and decreased self-esteem (Bianco, Malo, & Orlick, 1999; Gould, Udry, Bridges, & Beck, 1997; Tracey, 2003). Yet, this literature describing the after effects of injury has focused entirely upon the impact of injury on the injured individual.

In contrast, very little is known about how injury may impact the others on the team. An injury to one player may impact more than just the injured individual, and could potentially impact teammates, the coaches, the athletic department or organization, and possibly the greater community. If one player becomes injured and can no longer play, the rest of the players on the team may need to change their roles on the team. This may then translate into relevant changes within the team structure such as changes in playing position, starting status, and leadership needs and roles. As a result, a coach may need to modify strategy and coaching behaviors based on the change in team personnel available to play (e.g., developing skills of the injured player's replacement). In addition, if the absence of a player from competition affects the performance of the team, this can have implications for the sport organization or athletic department. Performance records (e.g.,

team statistics, championship titles) are commonly used in recruitment of new players, coach employment, and gaining sponsorship. Hence, injury to an individual player may generate a sort of "ripple effect" from the individual through the team or system, resulting in a variety of costs to the individual, the team, the coach, and the system as a whole. Therefore, gaining an understanding of the impact injury has upon the team would be beneficial in helping teams function optimally without the injured team member.

Little is known about how the loss of a team member due to injury may impact the team. Research in the area of collective efficacy provides a foundation from which to examine the effect of injury on the team. For example, a team may be impacted by the loss of a teammate if the team perceives the loss of the injured player as a decrease in the teams' available resources, a key component of collective efficacy. Bandura (1982) originally introduced the concept of *collective efficacy*, referring to the perceptions of collective competency and expectations for success. More recently, he defined collective efficacy as "a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainments" (1997; p. 477). Thus, the assumption that a team may be impacted by the loss of a player on the team relates to the team's collective perceptions of their available resources and their ability to overcome this adversity.

Bandura's definition of collective efficacy provides a psychological construct for examining how a sport team may be impacted by injury to an individual team member. To understand the concept of collective efficacy in sport, it is pertinent to understand what defines a sport team. The nature of sport teams is characterized by the necessity of

interdependence among team members. Carron, Hausenblaus, and Eys (2005) define sport teams as

> a collection of two or more individuals who possess a common identity, have common goals, and objectives, share a common fate, exhibit structured patterns of interaction and modes of communication, hold common perceptions about group structure, are personally and instrumentally interdependent, reciprocate interpersonal attraction, and consider themselves a group (p.13).

The notion that the whole is greater (but not necessarily better) than the sum of its parts led Bandura (2000) to contemplate the importance of confidence of the collective rather than the individual. He discusses the commonality of teams saturated with individually talented members performing poorly as evidence that "the perceived collective efficacy is not simply the sum of the efficacy beliefs of individual members. Rather, it is an emergent group level property" (p.76).

Research examining the impact of injury to a teammate on the team's collective efficacy is extremely limited. Most of the research on collective efficacy in sport teams has focused on the relationship between collective efficacy and team performance (Edmonds, Tenenbaum, Kamata, & Johnson, 2009; Feltz & Lirgg, 1998; Meyers, Feltz, & Short, 2004; Meyers, Payment, & Feltz, 2004) as well as other team dynamics such as team cohesion (Kozub & McDonell, 2000; Paskevich, Brawley, Dorsch & Widmeyer, 1999; Spink, 1990). These studies purport that there is a positive relationship between collective efficacy and team performance (i.e., higher collective efficacy was related to better performance outcomes) in teams with high interdependence (e.g., hockey, football). More recently, results from two meta-analyses (Gully, Incalcaterra, Joshi, &

Beaubien, 2002; Stajkovic, Lee, & Nyberg, 2009) revealed a significant positive relationship between collective (team) efficacy and performance.

Although a relationship between collective efficacy and performance exists, there is only limited research examining how a factor such as injury may influence the team's perceived collective efficacy, and consequently team performance. Only two studies have examined the impact injury to a teammate has on the team's collective efficacy (Damato, Grove, Eklund, & Cresswell, 2008; Edmonds, Tenenbaum, Kamata, & Johnson, 2009) and both indicated that injury negatively affects the team's collective efficacy beliefs.

Injury appeared to influence collective efficacy in adventure racing teams (Edmonds et al., 2009). Edmonds and colleagues examined the influence of relevant sources of efficacy (i.e., prior performance and preparation effort) on collective efficacy and on the collective efficacy- performance relationships in 17 three-person Adventure Racing teams. Using sport-specific measures of collective efficacy and environmental factors-conditions (i.e., questions about weather and course conditions, teammate injury, time of day), they found a positive relationship between collective efficacy and performance throughout the race. Also, teams who reported an injury to one of their teammates subsequently reported decreased levels of collective efficacy for their team (Edmonds et al., 2009). While teammate injury was not a main variable for analysis, these results indicate a possible relationship between teammate injury and collective efficacy.

In an exploratory study with Australian male soccer teams, Damato and colleagues (2008) collected preseason data from 194 male soccer players, representing 12

teams in a semiprofessional soccer league in Western Australia. They evaluated the effects of hypothetical scenarios of injury to pivotal and non-pivotal teammates on only two types of collective efficacy (skill and perseverance). Results showed that the hypothetical loss of a player to injury had a significant negative effect on perseverance collective efficacy (but not skill collective efficacy) for both pivotal and non-pivotal player conditions. This study is the only research to date in which injury and collective efficacy were the main variables examined.

Although Damato et al. (2008) and Edmonds et al. (2009) have contributed to our early understanding of how injury to an individual may negatively impact a team's collective efficacy; there are several areas that remain unexplored. For example, female athletes were underrepresented: females represented only one-third of the Edmonds et al., (2009) sample and were not included at all in the Damato et al., (2008) sample. Second, although both studies used highly interdependent sport teams (soccer and adventure racing), Damato et al. (2008) sampled from elite teams and results may not generalize to post-injury responses among non-elite teams. Edmonds et al. (2009) used very small groups (3 members per team), which is not reflective of most common sport teams, making it difficult to generalize their results, as collective efficacy beliefs may be influenced by group (team) size (Short, 2006). Finally, both of these studies measured collective efficacy based upon Bandura's (1997) definition by using a sport- specific scale that focused heavily on sport-specific skill abilities. For example, items included rating the team's ability to "dribble past opponents effectively" (Damato et al., 2008) and "canoeing" (Edmonds et al., 2009). Measuring collective efficacy with a different

measure created for each study/sport limits generalizability from sport to sport and from research study to research study. To gain a fuller understanding of collective efficacy as a construct, collective efficacy research needs to begin to use measurement tools that can be used across sports and research studies.

In sum, the purpose of this study was to examine how a team's collective efficacy might change as a result of a teammate's injury. This study extended the literature in several ways. First, this research is the only known study other than Damato et al. (2008) to focus on the impact of injury on the team's collective efficacy. Second, this study investigated the research questions in an equally representative female and male population, and focused on the collegiate level (vs. elite). Additionally, this study was able to compare gender differences in collective efficacy. Soccer teams were chosen due to their high levels of interdependence and the high rates of reported injury occurrence among both female and male collegiate soccer teams. Interdependence, or the amount of collaboration and interaction between team members, has been shown to be a moderator of the collective efficacy and performance relationship, such that the relationship between collective efficacy and performance is stronger when interdependence of groups or teams is high (Gully, Incalcaterra, Joshi, & Beaubien, 2002; Stajkovic, Lee, &Nyberg, 2009). Although this study replicated Damato et al. (2008)'s design through the use of a hypothetical injury scenario paired with a collective efficacy measure, there were a couple of key differences. Whereas Damato et al. (2008) used both a pivotal and non-pivotal player description, this study focused on a pivotal player as per Damato et al.'s

suggestions given that their results found no significant difference between the loss of a pivotal versus nonpivotal player on collective efficacy.

Additionally, the Collective Efficacy Questionnaire for Sports (CEQS; Short, Sullivan, & Feltz, 2005) was used to measure collective efficacy instead of a soccer-specific measure. The CEQS was developed to measure collective efficacy beliefs across sports and provides a contrast to the many sport-specific collective efficacy measures that have been developed. The CEQS is a 20-item instrument comprised of five subscales (ability, effort, persistence, preparation, and unity) and has established construct (i.e. convergent, divergent, and predictive) validity (Short, Sullivan, & Feltz, 2005). Using the CEQS rather than a soccer-specific measure of collective efficacy will enhance replicability and generalizability to sports other than soccer.

This study was developed to examine how a team's collective efficacy might change as a result of a teammate's hypothetical injury. Specifically, the following research question was addressed: Does the loss of a teammate due to injury impact the team's collective efficacy? Based upon prior research, it was hypothesized that team collective efficacy would decrease following the loss of a teammate due to hypothetical injury.

CHAPTER II

REVIEW OF THE LITERATURE

The purpose of this study was to examine how injury impacts the team's collective efficacy. Injuries are common in sport and have psychological consequences for the injured athlete. However, the loss of an individual athlete due to injury likely has consequences for the team as well (Damato et al., 2008). Research has demonstrated psychological consequences of injury for the injured athlete (Gould, Udry, Bridges, & Beck, 1997; Tracey, 2003) and that collective efficacy is related to performance (Feltz & Lirgg, 1998; Myers, Feltz, & Short, 2004). Yet it remains unclear how injury to an individual player impacts the team. This chapter reviews research relating to the consequences of injury in sport, the relationship between collective efficacy and performance, and a detailed review of two studies that have examined the impact of injury to a teammate on the team's collective efficacy.

Injury In Sport

Injuries are common in sports, crossing sport types, age, gender, and performance level (i.e., elite vs. amateur). The NCAA Injury Surveillance Program Qualifying Report (2009), which collected and examined injury prevalence across 5 Fall Sports for a 5-year period, reported an estimated 266,973 injuries in collegiate football and 79,858 in women's soccer. Although the number of reported injuries was greatest in football, women's soccer had the highest injury incidence of 10.9 (per 1000 athlete exposures) as

compared to 10.5 in football (Marshall & Corlette, 2009). For women's soccer in particular this report provided evidence of higher injury incidence rates in Division 1 athletes (11.8) as compared to Division II (9.7) or III (10.9). In addition, the total number of days lost due to injury was higher in Women's soccer (13.2) than in Men's soccer (7.8).

In addition to the adverse effects that injuries have on physical functioning, they can also have psychological consequences. Increased injury prevalence in sport has resulted in an increase in researcher's interest in studying athletes' cognitive, emotional, and behavioral responses to sport injury (Brewer, 2007). This growing body of literature focuses on the injured individual and falls into four categories of focus: attributions for injury, self-perceptions following injury, perceived benefits of injury, and coping strategies (Brewer, 2007). Injured athletes experience feelings of depression, anxiety, loss, frustration, anger, isolation, and decreased self-esteem (Gould, Udry, Bridges, & Beck, 1997; Tracey, 2003). In addition, research has shown that injured athletes often express decreased self-efficacy in relation to their perceived ability to perform successfully in their sport (Doyle, Gleeson, & Rees, 1998). Self-efficacy has also been demonstrated to have a role in performance outcomes in injury rehabilitation and recovery. For example, injured athletes with greater self-efficacy are more likely to adhere to rehabilitation programs (Taylor & May, 1996). Although the research shows that injury has an impact on self-efficacy, which impacts performance outcomes in individuals, the impact that an injury to an individual player could have on the team's efficacy has received limited attention.

Injuries can be extremely stressful and disruptive events for athletes (Bianco, Malo, & Orlick, 1999; Brewer & Petrie, 1995; Gould, et al., 1997). The stresses of injury can include dealing with cognitive (e.g., losing position on team), social (e.g., pressure from coaches), and physical (e.g., restricted physical activity) stressors (Bianco, et al., 1999). In fact, a sport injury may be one of the most stressful events an athlete can experience (Danish, 1986). Research examining the consequences of injury has centered on the injured individual's response to these stressors (Bianco et al. 1999; Brewer, 2007; Gould et al., 1997; Tracey, 2003) and has neglected the likely impact on the team despite sport being a social context.

Carron, Hausenblaus, and Eys (2005) define sport teams as

> a collection of two or more individuals who possess a common identity, have common goals, and objectives, share a common fate, exhibit structured patterns of interaction and modes of communication, hold common perceptions about group structure, are personally and instrumentally interdependent, reciprocate interpersonal attraction, and consider themselves a group (p.13).

Members of sports teams consistently interact with teammates, coaches, and others in their sport. Interdependence between team members is inherent in team sports (i.e. basketball, soccer, rugby) and is essential for optimal team performance (Carron et al., 2005). Therefore, it is logical that injury to one team member may not only affect the injured individual but may also have an impact on the team. The loss of a player due to injury could impact the evaluation of a team's collective resources, coordinative capabilities and shared beliefs, all components of collective efficacy. According to Bandura (1997), "Athletic teams also experience a crisis of efficacy after the loss of a

superstar, especially if they attribute much of their success to their departed teammate" (p.403). In addition, it has been found that some stressors are negatively related to perceptions of collective efficacy, and may negatively impact group functioning in military groups (Jex & Thomas, 2003). However, there is a lack of research in sport on the impact stressors (e.g., injury) may have on collective efficacy and consequently on team performance.

Collective Efficacy

The loss of a teammate to injury may impact the team in several ways, but it likely affects performance through its impact upon the team's collective efficacy. Collective efficacy is defined as **"**a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainments" (Bandura, 1997 p. 477). Collective efficacy influences the choice of group activities, the amount of effort a group puts forth in such activities, and the degree to which the group persists in the face of adversity (Carron et al., 2005). Collective efficacy definitions and research have emerged out of a larger body of literature examining efficacy beliefs in general, and self-efficacy perceptions in particular.

Efficacy refers to the belief that an objective can be accomplished. Although similar to confidence, efficacy is a distinctly different construct. Confidence is a more global and stable characteristic, whereas efficacy (both self- and collective) is situation specific and fluctuates (Carron, Hausenblaus, & Eyes, 2005). Albert Bandura was the first to theorize extensively on the importance of efficacy expectations. He defined perceptions of self- efficacy as "judgments of how well one can execute courses of action

required to deal with prospective situations" (Bandura 1982, p. 122). Bandura suggests that self-efficacy influences choice of activity, how much effort is put forth, and degree of persistence in the face of obstacles or adversity. Self-efficacy, according to Bandura (1982), is positively related to performance.

Although most of Bandura's discussion of efficacy centers on individual manifestations, he also touches upon the collective nature of efficacy in a group, reminding us that individuals do not live in isolation but interact with others (Bandura, 1982). Many tasks or problems cannot be solved individually. Therefore the interactions between people and their shared beliefs about the groups' efficacy become important. This is especially the case in sport teams that require team members to interact and coordinate their abilities in order to function optimally. Bandura (1982) introduced the concept of collective efficacy referring to the perceptions of collective competency and group expectations for success.

Since Bandura's initial conceptualization there have been several attempts at defining collective efficacy. However, two main definitions prevail. Zaccaro, Blair, Peterson, and Zazanis (1995) determined that collective efficacy refers to "a sense of collective competence shared among individuals when allocating, coordinating, and integrating their resources in a successful concerted response to specific situational demands" (p. 309). Whereas Bandura (1997) defines perceived collective efficacy as " a group's shared belief in its conjoint capabilities to organize and execute the courses of action required to produce given levels of attainments" (p. 477). Both of these definitions reflect Bandura's (1997) notion of self-efficacy as a form of situation-specific

confidence. Additionally, both definitions emphasize that collective efficacy is a shared belief among group members and that the specificity of group tasks must be taken into account (Feltz, Short, & Sullivan, 2008). Collective efficacy can develop from a variety of sources, many of which are similar to sources of self-efficacy. Prior performance accomplishments, vicarious experiences, verbal persuasion, group leadership, group size, and group cohesion have all been identified as sources of collective efficacy (Bandura, 1982, 1986; Zaccaro et al., 1995).

Furthermore, research has demonstrated an important relationship between team cohesion and collective efficacy. Spink (1990) examined the relationship between team cohesion and team efficacy in volleyball teams, and looked for differences in this relationship between teams. He found that elite teams with high collective efficacy had higher team cohesion, providing support for a positive relationship between collective efficacy and team cohesion in elite, but not recreational volleyball teams (Spink, 1990). In addition, Spink's (1990) results suggested that task cohesion, rather than social cohesion, was more important in the relationship with collective efficacy.

The finding that collective efficacy is positively correlated with team cohesion in sport was corroborated by later exploratory studies in volleyball (Paskevich, et al., 1999) and rugby teams (Kozub & McDonell, 2000). In addition, Paskevich, Brawley, Dorsch, and Widmeyer (1999) extended the literature on collective efficacy by developing a sport specific measure of collective efficacy.

Measurement of collective efficacy.

Measurement of collective efficacy has been a major challenge in understanding this construct and the ability to replicate studies. Collective efficacy measurement in sport is related to how collective efficacy is defined (Feltz et al., 2008). The majority of collective efficacy research in sport has utilized Bandura's (1997) definition of collective efficacy and the conceptual understanding of collective efficacy as a group level construct that emerges or is composed from individual perceptions (Feltz et al., 2008). Bandura suggests measuring collective efficacy in two ways: by aggregating team members' individual responses to judgments of their own capabilities to perform within the team, or by aggregating team members' individual responses to judgments of their team's capability as a whole. Bandura suggests that the latter encompasses the coordinative and interactive influences operating within the group. In addition, according to Bandura (1997), the degree of interdependent effort needed for successful team performance dictates which method to use. For example, if interdependence is high (e.g., soccer teams) the aggregate of individual's appraisals of the team's capabilities is a better measure of collective efficacy than the aggregate of individual's appraisals of their own capabilities. Research by Feltz and Lirgg, (1998) and Myers, Payment, and Feltz (2004) have provided evidence to support this hypothesis.

Sport-specific measures of collective efficacy have been developed based on Bandura's recommendations for assessing interdependent sports including ice hockey (Feltz & Lirgg, 1998; Myers, Payment, & Feltz, 2004), football (Myers, Feltz, & Short, 2004), rugby (Kozub & McDonnell, 2000), volleyball (Paskevich et al., 1999), soccer

(Damato et al., 2008), and adventure racing (Edmonds et al., 2009). However, Short, Sullivan, and Feltz, (2005) developed the Collective Efficacy Questionnaire for Sports (CEQS) to measure collective efficacy beliefs across sports. Many of the sport-specific measures dealt with the team's ability, whereas the CEQS encompasses a broader scope of aspects of team functioning in measuring collective efficacy. The CEQS is a 20-item instrument comprised of five subscales (ability, effort, persistence, preparation, and unity). The CEQS has established construct (i.e., convergent, divergent, and predictive) validity (Short, Sullivan, & Feltz, 2005).

Collective efficacy and performance.

Research has centered on examining collective efficacy in relation to performance, and has been conducted in both sport and non-sport contexts. Outside of sport, research has demonstrated that collective efficacy influences the activities groups choose, the amount of group effort put into tasks, and group persistence when collective efforts fail or when overcoming obstacles. For example, Mulvey and Klein (1998) found that collective efficacy and social loafing influence motivation and performance in small work groups. In their study 392 undergraduate students were put into small work groups to complete two group projects over an 11-week time period. Tasks were divisible but required team interdependence for successful performance. Subjects were surveyed twice during the study as to their perceptions of social loafing, collective efficacy, and collective goal difficulty. Performance was measured as the final grade on the projects. The researchers found that perceived loafing had a negative impact on the group's goal commitment and consequently their performance, and that groups with higher collective

efficacy had higher goal commitment, with collective efficacy having direct and indirect effects on performance (Mulvey & Klein, 1998).

Although the subjects in Mulvey and Klein's (1998) study were in a work environment, the task they completed had some parallels to sport teams. The project could be divided into roles for individual group members but could not be completed without all members working interdependently, which parallels the sport environment. For example, in soccer individual players may take on individual roles (e.g., goalie, defender, striker) but in order to be successful as a group, all team members must coordinate their efforts and abilities to have a successful performance. In addition to work groups, collective efficacy has also been positively related with performance in combat teams (Jex & Bliese, 1999) and in educational workplaces (Parker, 1994).

Parker (1994) examined elementary school teacher's self- and collective efficacy beliefs in relation to their students and school's academic performance (e.g., standardized test scores). This study surveyed 239 teachers from 19 schools and found that self-efficacy and collective efficacy beliefs were related but independent constructs. In addition, as hypothesized, Parker found that socioeconomic status of the school's composition was a strong predictor of teacher's collective efficacy beliefs (Parker, 1994). Educational settings demonstrate an interesting parallel to sport teams, similar to that of workplace groups, in that there are individual members all working toward individual performance and collective performance as well. The results of Parker's (1994) study shows that an outside factor (e.g. socioeconomic status) may impact perceptions of collective efficacy at an organizational level.

Jex and Thomas (2003) examined the relationship between job-related stressors and group perceptions of collective efficacy and altruistic behavior in 2,403 military personnel comprised of 31 companies. These groups of combat soldiers differ from most sport teams in that they generally have a larger number of group members (i.e., average of 77 soldiers per company) however, the interdependent nature of combat tasks and group functioning is more similar to interacting sport teams (e.g., soccer) than other work-place or educational groups. The researchers found that some work-related stressors were negatively related to perceptions of collective efficacy, and suggested that work-related stressors may negatively impact group functioning (Jex & Thomas, 2003). This study had several limitations including that group functioning was assessed at an individual rather than a group level, the sample was 91% male, and collective efficacy was measured using a 4-item scale. Despite its shortcomings, the study by Jex and Thomas (2003) illustrates the beginning of understanding how stressors experienced by individuals in a group may impact the collective efficacy and group functioning of a group/team as a whole.

In conclusion, collective efficacy research in non-sport contexts has demonstrated that perceptions of collective efficacy have an impact on group performance. In addition, this literature reveals the importance of the role of interdependence in collective efficacy research, and that stressors experienced by group members may have negative implications for group functioning as a whole. Recent studies on collective efficacy in sport have aimed to reveal similar conclusions about the collective efficacy-performance relationship within sport teams.

Collective efficacy and performance in sport.

Research on collective efficacy in sport has been influenced by literature focused on self-efficacy perceptions in relation to performance, and by research done by Vealey (1986, 2001) in defining and identifying sources of sport confidence. The majority of this literature is grounded in Bandura's self-efficacy theory and until recently examined possible relationships only from the individual perspective (e.g., how self-efficacy or self-confidence related to performance) (Feltz et al., 2008) rather than from the collective perspective. However, in the last decade, several studies have examined the relationship between collective-efficacy and performance in sport.

Feltz and Lirgg (1998) investigated the relationship between self- and collective efficacy in collegiate hockey teams. The authors surveyed 159 hockey players representing 6 teams in regard to their beliefs of team and self-efficacy using a sport specific efficacy measure developed according to Bandura's (1986) recommendations. Hockey was chosen because of the high interdependence needed to be successful in the sport (Feltz & Lirgg, 1998). The results indicated that team efficacy beliefs were a stronger predictor of performance than aggregated individual player self-efficacy beliefs, and that past team performance impacts team efficacy beliefs (Feltz & Lirgg, 1998). In addition, results indicated that collective efficacy increased from beginning to mid-season, then decreased slightly until just before post-season tournament play when collective efficacy again increased. This was the first study to examine collective efficacy in actual sport teams, consider both individual and collective efficacy beliefs, and use a longitudinal design to examine trends in collective efficacy over a season. Additionally,

this study was the first study to consider the level of analysis (i.e., individual vs. team), an important measurement issue for collective efficacy research.

Myers, Feltz, and Short (2004) replicated Feltz and Lirgg's (1998) study by examining a different interdependent sport group. They collected data from 197 intercollegiate offensive football players representing 10 different universities, over the course of one competitive season. Similar to Feltz and Lirgg (1998), performance was measured using game statistics for a variety of sport specific skills and efficacy measures were developed to reflect perceptions of ability in football specific competencies. Myers et al. (2004) found that collective efficacy was a significant predictor of offensive performance. At any point in time, confident teams were more likely to perform better than less confident teams, and the collective efficacy of a given team from week to week would predict performance. In addition, the authors also found that prior performance positively predicted collective efficacy (Myers et al., 2004).

To this point, all the sport-specific collective efficacy studies had used only male participants (Feltz et al., 2008). Therefore in order to extend the literature and examine possible gender differences, Myers, Payment, and Feltz (2004) sought to replicate Feltz and Lirgg's (1998) study with female collegiate ice hockey players. The authors replicated the earlier study and statistically controlled for the influence of previous collective efficacy on past performance, the latter of which had not been done in previous studies. Myers, Payment, and Feltz (2004) found that the influence of collective efficacy on team performance was positive and stronger than the influence of team performance on collective efficacy. In addition, they also found that previous performance

significantly predicted subsequent collective efficacy, and that collective efficacy was a significant and stronger predictor of performance than past performance. This study demonstrated the reciprocity of the collective efficacy-performance relationship and illustrated the variant nature of collective efficacy, which has implications for possible interventions aimed at increasing collective efficacy in order to improve performance.

Edmonds, Tenenbaum, Kamata, and Johnson (2009) examined the influence of relevant sources of efficacy (i.e., prior performance and preparation effort) on collective efficacy and explored the collective efficacy-performance relationship in 17 three-person Adventure Racing teams. Adventure Racing, which is comprised of a variety of activities conducted in a series of stages, enabled measurement of perceived collective efficacy prior to and between stages of the competition. Whereas previous studies (Feltz & Lirgg, 1998; Myers et al., 2004; Myers, Payment, & Feltz, 2004) were limited to measuring collective efficacy before and after competition, Edmonds et al. (2009) were able to collect data *during* a competition due to the nature of the sport. In this study, performance was measured by the time it took each team to complete each segment of the race. The results indicated a moderate to strong positive relationship (with *r* ranging from .811-.905) between collective efficacy and performance for each segment of the race and throughout the entire race. In addition, this study provided support that sources of collective efficacy information (specifically preparation effort and prior performance) had a positive impact on perceptions of collective efficacy. Edmonds and colleagues (2009) also found correlational support for a relationship between injury to a teammate

and collective efficacy (r = -.64). Although this was not a primary interest of the study, it is one of two studies that have examined the effects of injury at a team level.

Thus, studies have demonstrated a relationship between collective efficacy and performance both in and outside of sport. In 2002, Gully, Incalcaterra, Joshi, and Beaubien conducted a meta-analysis, which examined the collective efficacy-performance relationship in a variety of research contexts, including business, industry, management, psychology, and one study in sport. The initial search criterion used was mention of the terms "*group* or *team* or *collective* or *unit* and *efficacy* or *potency* or *esteem* or e*xpectancy* or *feedback* or *beliefs* or *confidence* or a*spirations* or *perceived success* or *perceived failure* or *perceived ability* or *morale* or *spirit* or *confidence*" (p. 823-824), which located 314 published and unpublished articles. Studies were excluded because they were unobtainable (8%), nonempirical (23%), irrelevant (37%), and/or redundant (11%), which resulted in a sample of 67 (21%) empirical studies and 114 effect sizes. Gully and colleagues (2002) found a significant, positive relationship between collective efficacy (they used the term *team efficacy*) and performance, with interdependence acting as a moderator of the relationship. Interdependence referred to the degree to which group members interacted and coordinated their efforts to achieve tasks, goals, and outcomes. Interdependence was determined by rating each of these dimensions (task, goal, and outcome) on a 4-point scale and then summing the three scores to determine a measure of interdependence ranging from zero to nine Gully et al., 2002). The relationship between collective efficacy and performance was found to be larger when interdependence was high rather than low (Gully et al., 2002). This has relevance

for the sport environment because a higher degree of collective efficacy in interacting team sports (e.g., soccer, volleyball) where players are more interdependent could be more important to the performance-efficacy relationship than in coacting team sports (e.g., wrestling, golf) (Carron et al., 2005).

Stajkovic, Lee, and Nyberg (2009) extended and corroborated the findings of Gully et al.'s (2002) meta-analysis. Stajkovic, et al. (2009) examined the relationships between collective efficacy, group potency and group performance in 96 studies, which included more recent studies since Gully et al.'s (2002) meta-analysis. Although Stajkovic et al. (2009) used similar search methods to Gully et al. (2002), the keywords used were slightly more streamlined (collective efficacy, team efficacy, group efficacy, group potency, and team potency). The search yielded an initial 290 studies of which 127 were included in the analysis. Inclusion criteria included analysis of collective efficacy or group potency in relation to group performance, and used a group level analysis. In addition, 31 of those studies were excluded if statistics or task description was not reported, or if collective efficacy and/or group potency was analyzed as a criterion rather than a predictor variable (Stajkovic, et al. 2009). The results of this meta-analysis also revealed a significant positive relationship between collective efficacy and group performance, and corroborated that interdependence acted as a moderator demonstrating that the higher the group's interdependence, the stronger the relationship (Stajkovic, et al., 2009).

Sport Injury and Collective Efficacy

Despite the growing literature base on collective efficacy within and outside of sport, there has been limited research on the impact stressors such as injury may have on perceptions of collective efficacy and consequently on performance. Currently there are only two studies that have examined the impact loss of a teammate due to injury has on the team's collective efficacy (Damato et al., 2008; Edmonds et al., 2009).

The theorizing of Bandura (1997) and the lack of research on sport injury's effect on collective efficacy led Damato, Grove, Eklund, and Cresswell (2008) to conduct an exploratory study examining the effect of injury on collective efficacy in soccer teams. This is the only study to date that focuses solely on injury's effect on perceptions of collective efficacy. The authors used sport-specific measures of collective efficacy and hypothetical scenarios of injury to pivotal and non-pivotal teammates to collect preseason data from 194 male soccer players, representing 12 teams in a semiprofessional soccer league in Western Australia. Damato et al. (2008) hypothesized that perceptions of collective efficacy would decrease with a loss of a pivotal teammate but would remain unchanged in the loss of a non-pivotal teammate. However, the results indicated that the loss of both pivotal and non-pivotal players had a significant negative effect on perseverance collective efficacy (but not skill collective efficacy). Perseverance collective efficacy was one subscale of collective efficacy and represented the participants' ratings of the ability of their team to persevere in the face of failure, to rebound from a difficult loss, and to maintain physical endurance necessary for success after the hypothetical loss of a teammate (Damato et al., 2008).

The findings of Damato et al. (2008) indicate the potential impact that a loss of a teammate to injury may have on the team's efficacy, and provide an important contribution to collective efficacy literature in sport. However, this study also had several limitations. First of all, subjects were all elite male soccer players in Western Australia, which limits generalizing to other populations such as females and non-professional athletes. Additionally, the measurement tool used for collective efficacy was sport-specific (limiting its use for replication in other sports), and focused heavily on skill efficacy (limiting understanding of other factors relating to collective efficacy).

Other than Damato et al. (2008), the only other empirical study that has examined collective efficacy and injury came as part of Edmonds et al.'s (2009) analysis of relevant influential sources of collective efficacy in adventure racing teams as discussed previously. In their study, athletes who reported an injury to one of their teammates subsequently reported decreased levels of collective efficacy for their team. This resulted in a significant negative relationship between collective efficacy and teammate injury ($r = -.64$). However, the impact of injury on collective efficacy was not the primary focus of their study and was generated from just one item in the *Environmental factors-conditions* measure ("How has a teammate's injury, if any, affected the team's overall performance?").

A few strengths of Edmonds et al. (2009) were the longitudinal design and the use of real injuries (versus hypothetical). However similar to other studies (Damato et al., 2008; Feltz & Lirgg, 1998; Myers, et al., 2004; Myers, Payment, & Feltz, 2004), collective efficacy was measured by using a sport- specific scale developed for the study.

Additionally, participants were predominantly male (34 males, 17 females) and consisted of small teams (3 members per team). This limits the ability to replicate results across different sports. Sport injury in this study had some inherent differences from the Damato et al. (2008) study in that injuries reported were factual rather than hypothetical. Additionally, injured team members could not be replaced by a substitute during the competition, which may have inflated the importance of injury to the injured athlete's teammates.

Summary and Direction

Based upon the literature reviewed, injury in sport is prevalent and stressful for athletes. Additionally, stressors have been shown to have a negative effect on collective efficacy perceptions in groups outside of sport implicating negative consequences on group performance. The relationship between collective efficacy and performance has been well established in research conducted in both sport and non-sport contexts where group interdependence is high. Given that injury impacts the self-efficacy beliefs of the injured athlete, it makes logical sense to explore whether injury has an impact on the collective efficacy beliefs of the team as well. Understanding how the loss of a team member affects the team perceptions of collective efficacy has important implications for assisting the team to cope with that loss and perform optimally. However, there are only two studies examining injury's effect on the team's collective efficacy.

Therefore, this study was developed to examine how a team's collective efficacy might change as a result of a teammate's injury. This study extended the literature in several ways. First, this study utilized a sample population of almost equal male and

female representation, allowing for gender comparisons. Second, this study investigated a sample of collegiate (instead of elite) teams. Soccer teams were chosen due to their high levels of interdependence and the high injury rates in both women's and men's collegiate soccer. Third, although this study replicated Damato et al.'s (2008) design through the use of a hypothetical injury scenario paired with a collective efficacy measure, there were a number of key differences. Whereas Damato et al. (2008) used both a pivotal and non-pivotal player description, this study focused only on a pivotal player as per Damato et al.'s suggestions. Finally, the Collective Efficacy Questionnaire for Sports (CEQS; Short, Sullivan, & Feltz, 2005) was used to measure collective efficacy instead of a soccer-specific measure. The CEQS was developed to measure collective efficacy beliefs across sports and provided a contrast to the many sport specific collective efficacy measures. Using the CEQS rather than a soccer-specific measure of collective efficacy enhances the ability to replicate and generalize to sports other than soccer.

Purpose and Hypotheses

Due to the limited research examining the impact of an individual's injury on the team's perceived abilities, the purpose of this study was to examine how a team's collective efficacy might change as a result of a teammate's injury. Specifically, the following research question was addressed: Does the loss of a teammate due to hypothetical injury impact the team's collective efficacy? Based upon prior research, it was hypothesized that team collective efficacy would decrease following the loss of a teammate due to hypothetical injury.

CHAPTER III

OUTLINE OF PROCEDURES

Participants

Participants included members of 17 men's and women's intercollegiate soccer teams recruited from NCAA Division I, II, and III programs in the Southeastern United States. Participants were included if they were student-athletes on the current team roster, present at the time of data collection, and eighteen years of age or older. An effort was made to obtain equal representation of male and female teams, as well as across NCAA Divisions I, II, and III.

Measures

Sample demographics. Participants' demographic data were collected using the Demographic Questionnaire (Appendix A). Data included age, gender, year of eligibility (i.e., freshman, sophomore, junior, senior, 5^{th} year senior, other), position(s) played (e.g., goalkeeper, forward) years playing on the current team, total number of years playing soccer, years playing on other collegiate teams, and average competition playing time (in minutes). Participants were also asked to provide information regarding their current health status and health history. Specifically, they responded to questions about their current participation status (i.e., healthy - participating with no restrictions, injured/ill - participating with restrictions, injured/ill - not participating, and non-participation due to non-medical reasons) and collegiate injury history (i.e., injuries experienced during

collegiate playing career, how long ago the injury occurred, and length of restricted participation).

Collective efficacy. The Collective Efficacy Questionnaire for Sports (CEQS) (Short, Sullivan, & Feltz, 2005) was used to measure collective efficacy in the current study (Appendix B). The CEQS is a five-factor instrument comprised of 20 items (four items per factor). The five subscales include Ability, Effort, Persistence, Preparation, and Unity. Responses are recorded on an 11-point Likert-type scale, from 0 (not at all confident) to 10 (extremely confident).

Short et al. (2005) conducted a 3-phase development and validation of the CEQS using college-aged student-athletes. In Phase 1 a questionnaire was developed and an exploratory factor analysis was performed revealing 5 collective efficacy factors. In Phase 2 a confirmatory factor analysis supported the 5-factor, 20 item measure. Phase 3 demonstrated construct validity of the CEQS by examining correlations among the CEQS subscales with a measure of team cohesion, as well as conducting a second confirmatory factor analysis to cross-validate the measure. Cronbach alpha reliability coefficients ranged from .81 to .96 for the CEQS subscales, indicating acceptable reliability. In addition, all five subscales are correlated with each other and the total score (range from .59 to .95) (Short et al., 2005).

For the current study, participants completed two versions of the CEQS (pre- and post-injury scenario). Cronbach alpha reliability coefficients for the study's sample ranged from .88 to .92 for CEQS subscales pre-injury and ranged from .89 to .94 for CEQS subscales post-injury, indicating good internal consistency.

Hypothetical scenarios. A brief player injury scenario was adapted from the "pivotal" player scenario used by Damato et al. (2008) (see Appendix C). The scenario describes a competition situation in which the player described becomes injured and must leave the game, with no plan of return. The hypothetical injury scenario used was adapted from the scenario used by Damato et al. (2008) for the "pivotal" player. Two modifications were made; first changes were made to the pronouns to represent a neutral gender (e.g., from *he* to *they*) and to state the type of injury (ACL injury). The ACL injury was chosen because of the commonality of this injury occurrence in soccer and to try to minimize variability in the interpretation of the injury situation. As Damato et al. (2008) found no significant difference in collective efficacy in response to the loss of a pivotal versus nonpivotal player; the pivotal scenario was used in this study. No other changes were made to the scenario.

Procedures

After receiving permission from the Institutional Review Board, coaches of 37 soccer teams (men's *n* =18, women's *n* =19) at 19 universities (NCAA DI = 14, DII = 2, DIII = 3) across North Carolina were contacted by the primary investigator via email and asked for their team's participation (Appendix D: Team Recruitment Letter / Email to Coaches). An email reminder was sent 1 week after initial contact to those coaches who did not respond (Appendix E: Recruitment Reminder Email). Phone calls and emails were used to follow-up on invitations that received no response after 2 weeks. Coaches were asked to forward the names of other university coaches that they believed might be

interested in participating in the study to the primary investigator to invite participation. This “snowball” technique provided opportunities for a broader range of participants.

Once coaches had agreed to let their teams participate, the primary investigator arranged a time to meet with the team. A convenient date and time to obtain informed consents (Appendix F) and collect data was arranged with each team either prior to or after a team training session. In addition, the coaches were asked to provide the team’s win-loss record at the time of data collection.

Seventeen teams agreed to participate in the study. Data were collected for each team either directly before or after a weekday training session during the regular competitive league season. Before any data collection, all team members were informed of the purpose of the study and informed consent to participate was obtained. Those individuals younger than eighteen years old were not allowed to participate. The primary investigator read a set of standardized instructions (Appendix G) to each team who were then given the opportunity to ask questions or to decline participation. No players on any of the 17 teams declined to participate. Each participant was assigned a code number to de-identify the data collected and maintain confidentiality. Informed consent (Appendix F) was obtained from all individual participants. Players were given a packet of questionnaires including a Demographic Questionnaire (Appendix A), the CEQS (Short et al., 2005) (Appendix B), and the adapted CEQS Post-Injury (CEQS-PI) which included the hypothetical injury scenario (Appendix C). The primary investigator was available to answer participant questions during survey completion. Participants placed completed questionnaires into a marked envelope upon completion.

Participants and coaches were thanked for their participation and informed that the results of the study would be available upon request. All procedures were conducted in accordance with the ethical guidelines of the University of North Carolina at Greensboro.

Data Analysis

The purpose of this study was to examine the impact of a team member's injury on the collective efficacy of the team. Since data were collected pre- and post- injury scenario from athletes within teams, a multilevel modeling approach was used in order to account for the fact that repeated measures from the same people are likely to be more similar to each other than they are to other people, and that people on the same team are likely to be more similar to each other than those on other teams. Multilevel modeling can statistically account for this non-independence. In addition, multilevel modeling also allows for simultaneous analysis of athlete and team-level predictors of collective efficacy. Myers and Feltz (2007) suggested that using multi-level modeling is the optimal framework to examine collective efficacy in sport, yet only one study using the CEQS has utilized this method of analysis (Dithurbide et al., 2009). Perceptions of collective efficacy included: ability, effort, persistence, preparation, and unity subscales, as well as collective efficacy total scores. Correlations among the five collective efficacy subscales and the total score were examined separately for pre-injury and post-injury responses.

Based on Bandura (1997) and prior data (Damato, et al. 2008; Edmonds, et al. 2009), it was hypothesized that team collective efficacy would decrease following the hypothetical loss of a teammate due to injury. To test this hypothesis, hierarchical linear

modeling (Raudenbush & Bryk, 2002) was used to analyze collective efficacy scores with time (i.e. pre-test or post-test) being the Level 1 predictor. The Level 2 (athlete level) variables were the number of years on the current team, current participation status, and collegiate injury history. Due to the similarity in scores and low numbers of participants in certain groups, the four current participation status categories (healthy - participating with no restrictions, injured/ill - participating with restrictions, injured/ill - not participating, and non-participation due to non-medical reasons) were collapsed into two groups (healthy vs. injured). The "injured" group combined the injured/ill- participating and the injured/ill- not participating categories, while the "healthy" group included the healthy- participating and the non-participation due to non-medical reasons categories. The "healthy" group was used as the reference variable in the HLM.

Level 3 (team level) variables included gender, NCAA Division, and performance record. Because of the small number of teams in each category for NCAA Division and performance record, categories were collapsed from three categories to two on the basis of similarity in scores. For example, NCAA Division II and III were combined into one group for the purpose of inclusion into the HLM with Division I as the reference. Similarly, due to the small numbers of teams within the categories for the performance record variable (winning, neutral, and losing), teams with winning records and teams with neutral records which had very similar scores were therefore combined and used as the reference in the HLM.

To create the 3-level HLM, time was the only predictor variable entered into the initial model. Next both athlete (Level 2) and team (Level 3) predictor variables were

added to generate the full model (Model 2). Then, a backward step-wise approach was used to retain only significant predictors of collective efficacy in the final model (Model 3).

CHAPTER IV

RESULTS

Participant Descriptive Statistics

Of the 37 teams contacted, 65% (*n* = 24) responded to email requests for participation with 46% (*n* =17) agreeing to participate and 19% (*n* = 7) declining the invitation. Of the 17 teams agreeing to participate, 100% of the teams were surveyed with no less than 90% of the roster for each team participating in data collection. Three hundred ninety-six participants, representing 17 teams, completed questionnaires. Approximately 7% of the surveys were missing data for items representing CEQS subscales; therefore mean item replacements were calculated for missing values within each factor. One participant's data was excluded from statistical analyses due to insufficient data on several of the questions for the CEQS measures, resulting in a final sample of 395 individuals from 17 teams (*N* = 395 athletes, 17 teams).

Of the 395 participants, there was nearly equal representation between men (51%) and women (49%). The participants ranged between 18-25 years of age (*M* = 19.6, SD = 1.45), had played soccer between 2- 21 years (*M* = 13.83, SD = 2.88), and had played for their current teams between 1-5 years (*M* =1.97, SD = 1.09). Table 1 provides means and standard deviations for the sample demographics by gender.

Data obtained relative to participants' injury health history and current health status is presented in Table 2. At the time of data collection, the majority of the sample

(77%) reported being healthy and participating without restrictions, compared to those who were currently injured/ill and participating with restrictions (18%), were injured/ill and not participating (4%), or were not currently participating for non-medical reasons (1%). No data were excluded from the analyses due to current injury status. These four categories were collapsed into two categories (injured and healthy) in order to use current participation status as a variable in subsequent analyses.

Individual participant data was nested within teams, resulting in seventeen (N= 17) intercollegiate soccer teams from Division I, II, or III athletic programs (See Table 3). Teams were primarily (53%) from Division I athletic programs. Division II and III teams were collapsed into one group for statistical analysis pertaining to the main hypothesis due to the small numbers of teams in each division and the similarity of scores. The number of players on each team ranged from 17-30 (M = 23.2, SD = 4.06). Data collection occurred midway through the regular season for most teams. At the time of data collection, 53% of the teams had positive win-loss records, with a greater number of men's teams having winning records compared to women's teams (See Table 3).

Preliminary Analyses

Table 4 presents the aggregated team descriptive statistics for the CEQS subscales and total score for pre- and post-injury (N =17). Pearson correlation coefficients between the five CEQS subscales and the total CEQS score are provided in Table 5 (pre-injury) and Table 6 (post-injury). As can be seen, strong significant positive correlations were found between all CEQS factors and total scores for both pre- injury ($r's$ = .74 to .95, all $p < .001$) and post-injury ($r's$ = .84 to .97, all $p < .001$). Additionally, Time 1 (pre-injury)

and Time 2 (post-injury) CEQS responses for all CEQS factors (ability, effort, persistence, preparation, and unity) and CEQS total scores were positively correlated (*r's* = .62 to .79, $p < .001$) (Table 7). Since all CEQS factors were highly correlated with the CEQS total, only the CEQS total was used in subsequent analyses, as suggested by previous research using the CEQS (Dithurbide, Sullivan, & Chow, 2009; Short et al., 2005).

Test of the Hypothesis

To assess whether team perceptions of collective efficacy decreased following the hypothetical injury of a team member, a multi-level analysis was conducted with time nested within athletes and with athletes nested within teams. Initially, time was the only predictor variable entered into the model. Next both athlete (Level 2) and team (Level 3) predictor variables were added to generate the full model (Model 2). Then, a backward step-wise approach was used to retain only significant predictors of collective efficacy in the final model (Model 3). The results of the 3-level hierarchical linear model for collective efficacy are presented in Table 8. Results yielded a significant positive effect for the Level 1 predictor of time ($\beta = .49$, t (393) = 10.79, $p < .001$). Thus, Time 1 scores were significantly higher than Time 2 scores indicating that team perceptions of collective efficacy decreased following the hypothetical injury of a team member.

At the athlete level, only current participation status reached significance as a predictor of collective efficacy ($p < .05$). Injured players compared to healthy players had higher scores of collective efficacy ($\beta = .28$, t (377) = 2.03, $p = .043$) in the full model

(Model 2, See Table 8). However, in the final model this effect was no longer significant. No other athlete level variables were significant predictors of collective efficacy.

At the team level, performance was a significant predictor of collective efficacy (β = -1.10, t (15) = -3.56, p = .003) in the full model. Teams with losing performance records at the time of data collection had significantly lower collective efficacy total scores than teams with winning or neutral records. No other team level variables were significant predictors of collective efficacy. The effect of gender on collective efficacy was of particular interest since females had been underrepresented in previous research. However, there was no significant gender difference (p = .326) in collective efficacy scores. There were no significant interaction effects between time and performance (p = .226), time and Division (p = .077), and time and gender (p = .228).

To follow-up the main analyses, the same process using hierarchical linear modeling was repeated for each CEQS subscale as the dependent variable (CEQS ability, CEQS effort, CEQS persistence, CEQS preparation, and CEQS unity) to cross check that using the CEQS total was appropriate. For each model, time remained a significant predictor variable ($p < .001$), as did performance at the $p < 0.05$ level. No other athlete or team level variables were significant predictors of collective efficacy using CEQS subscales.

CHAPTER V

DISCUSSION AND CONCLUSIONS

The purpose of this study was to examine how the loss of a teammate to injury might impact the collective efficacy perceptions of the team. As hypothesized, findings show that team perceptions of collective efficacy decrease following the hypothetical injury of a team member. Teams believed that following the loss of a teammate to injury the team's ability to perform a variety of tasks would be less than before the injury. One possible explanation for this could be that teams view the loss of a teammate to injury as a decrease in the team's available resources. According to Bandura (1982), perception of available team resources is a key component of collective efficacy, and any perceived decrease in team resources (e.g. available players) could decrease collective efficacy. Hence, when injury results in the loss of a teammate, team collective efficacy perceptions may decrease.

In addition to a main effect for time, results showed that performance record was also a significant predictor of collective efficacy. Teams that had accumulated more losses than wins at the time of data collection had significantly lower collective efficacy scores than teams who had winning or neutral performance records. However, performance did not affect the degree to which collective efficacy changed over time (the interaction effect was not significant). Team collective efficacy perceptions may be greater or lesser as performance outcomes change the team's performance record. It may

therefore be important to consider whether the team has a winning, losing, or neutral performance record when measuring collective efficacy.

At the athlete level, the only variable that approached significance in predicting collective efficacy was current participation status. The majority of the sample (77%) was healthy and participating without restriction, so for the purposes of data analysis the two injured categories were combined (injured/ill, participating with restrictions, and injured/ill, not participating) and the small number of not participating for non-medical reasons were combined with the healthy and participating group. Results indicated that injured athletes had higher perceptions of collective efficacy than their healthy teammates. One possible explanation for this is that injured athletes tend to be less involved in daily practice sessions and competitions than their healthy counterparts. This decreased involvement may facilitate injured athletes having inflated perceptions of their team's abilities as compared to their healthy teammates whose perceptions of the team's abilities may be more accurate.

Experiencing a previous injury was another athlete level variable that was examined as a potential predictor of collective efficacy. There was no significant effect of previous injury on perceptions of team collective efficacy, indicating that those athletes who had experienced an injury while playing for their current team did not differ from those who had not had an injury. It was considered that players with previous injuries may have been more sensitive to the hypothetical injury scenario and could potentially have differing perceptions of the impact of injury on collective efficacy, however this was not found to be the case. The number of years on the current team was also not a

predictor of collective efficacy perceptions, indicating that players who had been apart of the team longer (e.g. seniors) did not differ from newer team members (e.g. freshman).

In addition to current participation status and years on the team, gender was examined as a potential predictor of collective efficacy. Female athletes had been underrepresented in the previous research studies examining injury and collective efficacy (Damato et al., 2008; Edmonds et al., 2009). Therefore, it was of interest to compare collective efficacy perceptions by gender and to examine an interaction between gender and time. Our results did not indicate significant results for gender nor a gender interaction. These non-significant results may be due to the limited sample size at the team level (n=17, 9 women's, 8 men's). Alternatively, it may reflect that collective efficacy does not differ by gender.

Results of this study were consistent with previous research conducted by Damato et al. (2008), who also found that collective efficacy perceptions decreased after a hypothetical injury to a teammate. Although the corroboration of the main effect for time was not surprising, it is of interest given the different measure of collective efficacy used (CEQS; Short et al., 2005) and the inclusion of a different sport level (collegiate vs. professional). Results indicating performance record as a significant predictor of collective efficacy are also consistent with previous research that has found previous performance to impact collective efficacy perceptions (Feltz & Lirgg, 1998; Myers, et al., 2004; Myers, Payment, & Feltz, 2004) indicating that teams with better performance have higher perceptions of collective efficacy.

Results of this study indicated that injured athletes had higher perceptions of collective efficacy than their healthy teammates. Although these results were only significant in Model 2 at the $p < 0.05$ level, these results conflict with the research on collective efficacy and injury at the individual level. Previous research at the individual level has shown that injured athletes often express decreased self-efficacy in relation to their perceived ability to perform successfully in their sport (Doyle, Gleeson, & Rees, 1998) and often express feelings of isolation from the team (Gould et al., 1997). An assumption could be made that injured athletes might also indicate decreased collective efficacy given the parallels between self- and collective efficacy. However, the question remains why injured athletes may have greater perceptions of collective efficacy than their healthy teammates. As suggested previously, one possible explanation is injured athletes having less accurate perceptions of collective efficacy due to less involvement in team activities. Another possible explanation could be that collective efficacy by its very nature as a team-construct is perceived differently by members of the group than their perceptions of individual level factors.

This study extended prior research on injury and collective efficacy in sport in several ways. First, this study utilized collegiate athletic teams and a gender-balanced sample. This study was also the first study to utilize a multidimensional measure of collective efficacy in examining the impact of *injury* on collective efficacy. The results of this study further support the use of the CEQS (Short et al., 2005) as a usable measure of collective efficacy. Using the CEQS to measure collective efficacy could have implications in terms of being able to compare different sports within the same study as

well as replicating collective efficacy research across different sample populations. In addition, another strength of this study was the use of multilevel modeling (HLM) which has been used by only one other collective efficacy study in sport (Dithurbide et al., 2009) and has been suggested to be the optimal framework for statistical analysis in collective efficacy research in sport (Myers & Feltz, 2007).

Before discussing directions for future research, it is important to note this study's limitations. One limitation of this study was the use of only one sport within the collegiate athlete population. While the decision to use soccer teams was deliberate in order to be able to compare the results to that of Damato et al. (2008), the results may not generalize to other sports. It is possible in future research to replicate this study with a sample of different sport teams using the CEQS (Short, et al., 2005).

A second limitation of this study was that data were collected twice during one day for each team. A longitudinal design could potentially show changes in perceived collective efficacy. Perceptions of collective efficacy may change during the course of a competitive season (Feltz & Lirgg, 1998; Short, 2006), which may be indicative of other situations or team dynamics (e.g. team cohesion, the amount of time the team has played together, or previous performance) (Feltz, et al. 2008). Since collective efficacy, like self-efficacy, is a situation-specific construct and may change during the competitive season, a longitudinal study of the impact of injury on collective efficacy would be beneficial to understanding the potential relationship between injury and collective efficacy. Measuring the impact of injury on collective efficacy perceptions at multiple time points across a season (e.g. pre-season, early, mid-, and late in the competitive season) or before

each competition during a season would provide a more comprehensive understanding of how the impact of injury on collective efficacy perceptions might change over time. Also since team performance record was a strong predictor of collective efficacy beliefs and team performance record (wins vs. losses) changes after each competition, it would be important to measure collective efficacy at several points in the season when the performance record may be different.

Using hypothetical injury scenarios allows researchers to efficiently assess injury perceptions without relying upon actual injuries. However, using hypothetical injury scenarios may be a limitation because the situation is not "real". Bandura (1997) has cautioned against using hypothetical situations to assess efficacy perceptions because individuals may believe they have the confidence to do something, yet that confidence may differ when faced with the actual task. Nonetheless, hypothetical injury scenarios have been used successfully in injury rehabilitation studies (Grove, Hanrahan, & Stewart, 1990; Laubach, Brewer, Van Raalte, and Petipas, 1996), which demonstrate congruence between hypothetical injury and actual injury research (Damato et al., 2008).

Research on the impact of injury on collective efficacy is still relatively new. Therefore, future research should be directed towards replicating this study using hypothetical injury scenarios with other interdependent sport teams to see if these results generalize to other sports and competitive levels. In addition, studies should aim to include a higher number of total teams including both genders to eliminate limitations due to statistical power of analyses and allow for further exploration of any possible gender differences.

Future research should also utilize multilevel modeling (e.g. using hierarchical linear modeling, HLM) which allows for data analysis at the individual and team level simultaneously and is optimal for collective efficacy research (Dithurbide et al., 2009; Meyers & Feltz, 2007). As previously mentioned, future research should also consider a longitudinal design. Since collective efficacy is a situation-specific construct, it could potentially change as the season progresses. Measuring collective efficacy perceptions at multiple time points during a season or before and after each competition could potentially get at effects of both injury and performance.

Finally, future research should eventually examine the impact of actual (vs. hypothetical) injury to team's collective efficacy. Assessing collective efficacy perceptions before and after an actual injury could help to improve the validity of this research. For example, a study that compared actual vs. hypothetical injuries on team collective efficacy perceptions could test Bandura's (1997) theory that individuals or teams may overestimate their abilities to overcome adversity in hypothetical situations as compared to real situations. Another example could be replicating the current study with actual injuries. This could be done in future research by utilizing a longitudinal design so that if an actual injury occurred the pre-injury data would already be collected. Using actual injuries could improve the accuracy of team perceptions of collective efficacy. However, it is possible that other confounding factors (e.g., the role of the particular injured player or players' personal biases towards the injured athlete) may influence the team's collective efficacy perceptions as well. Assessing actual injury could also present a number of challenges. It would necessitate using other measures such as open-ended

questions or in-person interviews. In addition, researchers would need to control for the type of injury and timing of injury occurrence, and find a way to measure other possible confounding variables.

In conclusion, this study examined the potential impact of losing a player to hypothetical injury on the collective efficacy beliefs of collegiate soccer teams. Using hierarchical linear modeling it was found that collective efficacy decreased following hypothetical injury. These findings support initial research that the consequences of sport injury extend beyond the individual athlete and may impact team function, extending existent research to include collegiate athlete populations of both genders. Since collective efficacy has been found to be related to sport performance, especially in interdependent teams, any stressors that may cause a decline in collective efficacy perceptions would likely decrease performance (Bandura, 2000).

Injury is ubiquitous in sports. Recognizing that player loss from injury can alter team efficacy suggests that further research in this area is needed. Athletes, coaches, and sports medicine practitioners may need to adopt a broader psychosocial perspective of sport injury consequences. For example, the impact of injury may extend beyond the physical effects of injury (having to physically replace a player because of injury) to include the psychological (changes in team confidence, motivation, effort) and social (filling the social role of that player (e.g. leadership)) factors. Additionally, injury to one individual on a team impacts others that are involved in the team. Although there is much research to be done in the area of injury and collective efficacy in sport, this study has

provided a vital step in explaining how the important variable of collective efficacy is influenced by injury.

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APPENDIX A:

DEMOGRAPHIC QUESTIONNAIRE

1. Age: _____
2. Gender (Circle one): Male Female
3. Position(s) Played (Circle all that apply): F M D GK
4. Year of Eligibility: (Circle one): Freshman Sophomore Junior Senior
   5th yr. Senior Other_____
5. Number of years on current team (Circle one): 1 2 3 4 5 or more
6. Total number of years competing in soccer: _____
7. Have you played for other college teams: (Circle one) Yes No
8. If you answered "Yes" to 7, how many years did you play on other college teams? _____
9. How much playing time do you typically get during a competition: (Circle one)

   0 min 20 min 45min 65 min 90 min

10. What is your current participation status? (Place an "X" beside one):

    _____Healthy/not injured/not ill, participating with no restrictions
    _____Injured/ill, participating with restrictions
    _____Injured/ill, not currently participating
    _____Not currently participating for non-medical reasons (e.g., academic probation, etc)

11. Have you ever been injured during your college playing career that prevented you from participating in at least one game or practice? (Circle one) Yes No
12. If you answered "Yes" to 11, then for your most recent and/or serious injury,

    a. how long ago did it happen? (Circle best match)
       0-3 months 3-6 months 6-12 months 12-15 months > 15 months

    b. how long were you away from and/or limited from participation: (Circle best match):
       < 1 week 1-4 weeks 1-3 months 3-6 months > 6 months

APPENDIX B:

COLLECTIVE EFFICACY QUESTIONNAIRE FOR SPORTS

Instructions: Please read the description below. Use the description of the following situation to answer the next set of questions.

Scenario
It is near the endpoint of the season and your team is playing a very evenly matched opponent where the outcome is crucial to your team's placement in the conference. You are coming off of a great win last week. Your team is playing on its home ground with the seats packed with excited fans. Every one of your starters is fit, healthy and ready to play. There are 15 min left in the game and the score is a 1–1 draw.

Instructions: In terms of the above situation, please rate your confidence that your team has the ability to…

		Not at All Confident									Extremely Confident
1.	Outplay the opposing team	0	1	2	3	4	5	6	7	8	9	10
2.	Resolve conflicts	0	1	2	3	4	5	6	7	8	9	10
3.	Perform under pressure	0	1	2	3	4	5	6	7	8	9	10
4.	Be ready	0	1	2	3	4	5	6	7	8	9	10
5.	Show more ability than the other team	0	1	2	3	4	5	6	7	8	9	10
6.	Be united	0	1	2	3	4	5	6	7	8	9	10
7.	Persist when obstacles are present	0	1	2	3	4	5	6	7	8	9	10
8.	Demonstrate a strong work ethic	0	1	2	3	4	5	6	7	8	9	10
9.	Stay in the game when it seems like your team isn't getting any breaks	0	1	2	3	4	5	6	7	8	9	10
10.	Play to its capabilities	0	1	2	3	4	5	6	7	8	9	10
11.	Play well	0	1	2	3	4	5	6	7	8	9	10
12.	Mentally prepare for this competition	0	1	2	3	4	5	6	7	8	9	10
13.	Keep a positive attitude	0	1	2	3	4	5	6	7	8	9	10
14.	Play more skillfully than the opponent	0	1	2	3	4	5	6	7	8	9	10
15.	Perform better than the opposing team(s)	0	1	2	3	4	5	6	7	8	9	10
16.	Show enthusiasm	0	1	2	3	4	5	6	7	8	9	10
17.	Overcome distractions	0	1	2	3	4	5	6	7	8	9	10
18.	Physically prepare for this competition	0	1	2	3	4	5	6	7	8	9	10
19.	Devise a successful strategy	0	1	2	3	4	5	6	7	8	9	10
20.	Maintain effective communication	0	1	2	3	4	5	6	7	8	9	10

APPENDIX C:

CEQS POST INJURY

Instructions: Please read the description below. Use the description of the following situation to answer the next set of questions.

Scenario
It is near the endpoint of the season and your team is playing a very evenly matched opponent where the outcome is crucial to your team's placement in the conference. You are coming off of a great win last week. Your team is playing on its home ground with the seats packed with excited fans. Every one of your starters is fit, healthy and ready to play. There are 15 min left in the game and the score is a 1–1 draw. Suddenly, you hear a scream and a pivotal player goes down with an obvious ACL injury and needs to be taken off the field. You realize there is no way they will be able to return to this game or any game in the near future and needs to be replaced by a reserve.

Instructions: Based on the above situation **and on the injury to the pivotal player,** please rate your confidence that your team has the ability to…

		Not at All Confident										Extremely Confident
1.	Outplay the opposing team	0	1	2	3	4	5	6	7	8	9	10
2.	Resolve conflicts	0	1	2	3	4	5	6	7	8	9	10
3.	Perform under pressure	0	1	2	3	4	5	6	7	8	9	10
4.	Be ready	0	1	2	3	4	5	6	7	8	9	10
5.	Show more ability than the other team	0	1	2	3	4	5	6	7	8	9	10
6.	Be united	0	1	2	3	4	5	6	7	8	9	10
7.	Persist when obstacles are present	0	1	2	3	4	5	6	7	8	9	10
8.	Demonstrate a strong work ethic	0	1	2	3	4	5	6	7	8	9	10
9.	Stay in the game when it seems like your team isn't getting any breaks	0	1	2	3	4	5	6	7	8	9	10
10.	Play to its capabilities	0	1	2	3	4	5	6	7	8	9	10
11.	Play well	0	1	2	3	4	5	6	7	8	9	10
12.	Mentally prepare for this competition	0	1	2	3	4	5	6	7	8	9	10
13.	Keep a positive attitude	0	1	2	3	4	5	6	7	8	9	10
14.	Play more skillfully than the opponent	0	1	2	3	4	5	6	7	8	9	10
15.	Perform better than the opposing team(s)	0	1	2	3	4	5	6	7	8	9	10
16.	Show enthusiasm	0	1	2	3	4	5	6	7	8	9	10
17.	Overcome distractions	0	1	2	3	4	5	6	7	8	9	10
18.	Physically prepare for this competition	0	1	2	3	4	5	6	7	8	9	10
19.	Devise a successful strategy	0	1	2	3	4	5	6	7	8	9	10
20.	Maintain effective communication	0	1	2	3	4	5	6	7	8	9	10

APPENDIX D:

TEAM RECRUITMENT LETTER

Dear Coach,

My name is Julie Sutcliffe and I am a sport psychology graduate student at the University of North Carolina at Greensboro. I am contacting you to request your assistance with my thesis research. My study is examining whether or not an injury to a teammate impacts the team's beliefs about performing successfully. As a college coach, you may have direct and/or indirect knowledge about how teams may be impacted by the loss of a teammate due to injury. Unfortunately, there is very little research exploring how an athlete's injury might affect his or her team. Currently, there is evidence that sport injury may result in negative emotional/psychological consequences for the injured athlete (i.e. emotional distress and decreased self-efficacy). Yet, we know very little about the potential consequences for the team, and my study would be one of only three to examine this question.
Would you be willing to let me come meet with the team for approximately 20-30 minutes at a time that you determine is convenient (i.e., before/after practice, team meeting, etc) so that I may request their participation in this study? Participation involves completing a survey packet only once, which should take no longer than 30 minutes to complete. If so, then you may reply to this email with possible dates and times or reply with a convenient time that I may call and speak with you in person to make arrangements. I will bring all materials required (i.e., pencil/pens and questionnaires to distribute and collect myself on site. If you or a member of the team are interested, I would be happy to provide a written summary of my findings.

Also, if you know of any other coaches who would be willing to assist me, please provide me with their contact information (i.e., name, school, ph# and/or email) so that I may forward this request to them as well.

Thank you for your time and consideration,

Julie H. Sutcliffe
Kinesiology M.S. Candidate
Specializing in Sport and Exercise Psychology
The University of North Carolina at Greensboro
jhsutcli@uncg.edu
(415) 676-7177

APPENDIX E:

RECRUITMENT REMINDER EMAIL

Dear Coach,

A few weeks ago I emailed you to request your assistance with my thesis research examining whether or not an injury to a teammate impacts the team's beliefs about performing successfully. I am a graduate student studying sport psychology at the University of North Carolina at Greensboro. As a college coach, you may have direct and/or indirect knowledge about how teams may be impacted by the loss of a teammate due to injury. Unfortunately, there is very little research exploring how an athlete's injury might affect his or her team. Currently, there is evidence that sport injury may result in negative emotional/psychological consequences for the injured athlete (i.e. emotional distress and decreased self-efficacy). Yet, we know very little about the potential consequences for the team, and my study would be one of only three to examine this question.

Since I have yet to receive a response from you, I wanted to follow up and ask you to consider allowing your team to participate in my study. Would you be willing to let me come meet with the team for approximately 20-30 minutes at a time that you determine is convenient (i.e., before/after practice, team meeting, etc) so that I may request their participation in this study? Participation involves completing a survey packet only once, which should take no longer than 30 minutes to complete. I will bring all materials required (i.e., pencil/pens and questionnaires to distribute) and collect them myself on site. If you or a member of the team are interested, I would be happy to provide a written summary of my findings.

If you are interested in participating, please email with possible dates and times or reply with a convenient time that I may call and speak with you in person to make arrangements. In addition, please feel free to forward this email on to other collegiate soccer coaches that you believe may be interested in having their team participate.

Thank you for your time and consideration,

Julie H. Sutcliffe
Kinesiology M.S. Candidate
Specializing in Sport and Exercise Psychology
The University of North Carolina at Greensboro
jhsutcli@uncg.edu
(415) 676-7177

APPENDIX F:

INFORMED CONSENT

UNIVERSITY OF NORTH CAROLINA AT GREENSBORO

CONSENT TO ACT AS A HUMAN PARTICIPANT

Project Title: The Effect of Hypothetical Injury on Collective Efficacy in Collegiate Soccer Teams

Project Director: Dr. Renee Appaneal

Participant's Name: _____

What is the study about?
This is a research project. This study will investigate the effect that a hypothetical injury has on the team's perceptions of collective efficacy. The aim of this study is to better understand how team collective efficacy beliefs may change as a result of injury to one player, and how this may impact team performance post-injury.

Why are you asking me?
We are looking for current collegiate soccer players, ages 18 and older, who currently play on a NCAA Division I, II, or III soccer team. Those who are under 18 years of age are not eligible for participation.

What will you ask me to do if I agree to be in the study?
Participants will be asked to complete a questionnaire regarding their beliefs about the team's abilities in a variety of situations. Then participants will read about a hypothetical situation where a teammate becomes injured. Participants will then complete another questionnaire regarding their beliefs about the team's abilities in regard to the hypothetical scenario. Completion of the questionnaires will take approximately 20-30 minutes to complete.

What are the dangers to me?
The Institutional Review Board at the University of North Carolina at Greensboro has determined that participation in this study poses minimal risk to participants. Participants may experience distress or react poorly to reading about a hypothetical injury to a teammate.

If you have any concerns about your rights, how you are being treated or if you have questions, want more information or have suggestions, please contact Eric Allen in the

Office of Research Compliance at UNCG at (336) 256-1482. Questions, concerns or complaints about this project or benefits or risks associated with being in this study can be answered by Julie Sutcliffe who may be contacted at (415) 676-7177 or jhsutcli@uncg.edu.

Are there any benefits to me for taking part in this research study?
There are no direct benefits to participants in this study.

Are there any benefits to society as a result of me taking part in this research?
There may be benefits to society such as furthering our understanding of how injury impacts the team and potentially informing future interventions to help teams cope with the loss of a teammate to injury.

Will I get paid for being in the study? Will it cost me anything?
There are no costs to you or payments made for participating in this study.

How will you keep my information confidential?
Consent forms will be kept separately from all other data collected. Your questionnaire will be assigned an identification code to protect your confidentiality. All data collection materials will be stored in a locked file cabinet inside a locked room on the UNCG campus. All information obtained in this study is strictly confidential unless disclosure is required by law.

What if I want to leave the study?
You have the right to refuse to participate or to withdraw at any time, without penalty. If you do withdraw, it will not affect you in any way. If you choose to withdraw, you may request that any of your data which has been collected be destroyed unless it is in a de-identifiable state.

What about new information/changes in the study?
If significant new information relating to the study becomes available which may relate to your willingness to continue to participate, this information will be provided to you.

Voluntary Consent by Participant:
By signing this consent form you are agreeing that you read, or it has been read to you, and you fully understand the contents of this document and are openly willing consent to take part in this study. All of your questions concerning this study have been answered. By signing this form, you are agreeing that you are 18 years of age or older and are agreeing to participate, or have the individual specified above as a participant participate, in this study described to you by Julie Sutcliffe.

Signature: _____ Date: _____

APPENDIX G:

INSTRUCTIONS FOR QUESTIONNAIRE ADMINISTRATION

1. **READ** to participants:

    - Today I am going to give you a questionnaire regarding your beliefs about your soccer team's abilities in certain circumstances. Completion of the questionnaire will take approximately 20 minutes.
    - The first sheet you have been given is an informed consent, by signing that sheet you agree to participate in the study. It is important for you to recognize that any answers you provide are completely confidential. No personal identification will be linked to your packet. If you choose to participate in this study please read and sign the informed consent now.
    - Once you have signed the informed consent please place it in envelope 1.

2. Hand out questionnaires.

3. **READ:**

    - I am now going to give you the questionnaire. Please read the instructions before each section carefully. If you have any questions regarding what a specific item means please raise your hand and I will come and help you. It is critical to the research that you are as honest as possible. Do not answer the question according to what you think you should say or feel, answer them according to how you ACTUALLY feel.
    - When you are finished with your questionnaire, please place it in envelope 2 (Show them the envelope). OK you can go ahead and begin.

APPENDIX H:

TABLES

Table 1. Means (Standard Deviations) for Athlete Sample Demographics

Variables	Females n= 195	Males n = 200
Age	19.39 (1.25)	19.85 (1.60)
Eligibility	2.26 (1.17)	2.17 (1.18)
Years of Soccer Experience	13.63 (2.56)	14.04 (3.15)
Years on Current Team	2.05 (1.09)	1.89 (1.09)
Years on Other Collegiate Teams	1.55 (.69)	1.67 (.77)
Typical Playing Time (Min) per Competition	53.81 (34.11)	50.25 (36.06)

Note: N= 395. For the variable of Years on Other Collegiate Teams, n = 38. Only some of the participants played on other collegiate teams.

Table 2. Frequencies of Sample Participation and Injury Status

Variables	Total n= 395 (% of column)	Female n= 195 (% of column)	Male n= 200 (% of column)
Participation Status			
Healthy, participating with no restrictions	304 (77)	160 (82.1)	144 (72.4)
Injured/ill, participating with restrictions	70 (17.7)	28 (14.4)	42 (21.1)
Injured/ill, not participating	16 (4.1)	6 (3.1)	10 (5.0)
Not participating for non medical reasons	4 (1)	1 (0.5)	3 (1.5)
Injured During College Career?			
Yes	263 (66.6)	121 (62.1)	142 (71)
No	132 (33.4)	74 (37.9)	58 (29)
Time Since Injury			
0-3 months	136 (51.7)	54 (44.6)	82 (57.7)
3-6 months	21 (8.0)	10 (8.3)	11 (7.7)
6-12 months	54 (20.5)	29 (24.0)	25 (17.6)
12-15 months	23 (8.7)	16 (13.2)	7 (4.9)
greater than 15 months	29 (11.0)	12 (9.9)	17 (12)
Duration of Limited Participation			
Less than a week	92 (35.0)	41 (33.9)	51 (35.9)
1- 4 weeks	95 (36.1)	41 (33.9)	54 (38.0)
1-3 months	44 (16.7)	21 (17.4)	23 (11.5)
3-6 months	15 (5.7)	7 (5.8)	8 (4.0)
more than 6 months	17 (4.3)	11 (9.1)	6 (3.0)

Table 3. Team Demographics

	Total	Female Teams n (% of teams)	Male Teams n (% of teams)
Teams	17	9 (53)	8 (47)
Competitive Level			
Division I	9	5 (55.6)	4 (44.4)
Division II	3	2 (66.7)	1 (33.3)
Division III	5	2 (40.0)	3 (60.0)
Performance Record at Data Collection			
Winning	9	3 (33.3)	6 (66.7)
Neutral	2	2 (100.0)	0 (0.0)
Losing	6	4 (66.7)	2 (33.3)

Table 4. Aggregated Descriptive Statistics for the CEQS

Variable	*M*	*SD*	α	Skew
Ability				
Pre Injury	8.23	0.75	.57	-0.90
Post Injury	7.48	0.88	.78	-0.82
Effort				
Pre Injury	8.28	0.70	.50	-1.03
Post Injury	7.72	0.81	.65	-1.23
Persistence				
Pre Injury	8.13	0.73	.54	-1.26
Post Injury	7.65	0.82	.67	-1.23
Preparation				
Pre Injury	8.26	0.73	.53	-1.00
Post Injury	7.72	0.80	.64	-0.96
Unity				
Pre Injury	7.97	0.88	.78	-1.39
Post Injury	7.68	0.87	.75	-1.26
Total				
Pre Injury	8.17	0.73	.54	-1.21
Post Injury	7.65	0.82	.67	-1.16

Note. N=17 teams. Collective efficacy was measured on an 11-point Likert-type scale, ranging from 0 to 10, where higher scores reflect a higher degree of collective efficacy.

Table 5.
Pre Injury (Time 1) Correlations Between CEQS Subscales and Total Scores

Variables	1	2	3	4	5	6
1. Ability	_____	.775**	.826**	.804**	.736**	.892**
2. Effort		_____	.886**	.854**	.858**	.942**
3. Persistence			_____	.848**	.843**	.949**
4. Preparation				____	.827**	.933**
5. Unity					____	.922**
6. **Total CEQS**						____
Mean	8.23	8.26	8.12	8.24	7.96	8.16
Standard Deviation	1.33	1.30	1.33	1.30	1.44	1.24

Note: N= 395. ** $p < .05$.

Table 6
Post Injury (Time 2) Correlations Between CEQS Subscales and Total Scores

Variables	7	8	9	10	11	12
7. Ability (PI)	____	.856**	.886**	.861**	.836**	.933**
8. Effort (PI)		____	.923**	.890**	.904**	.960**
9. Persist (PI)			____	.886**	.911**	.967**
10. Prep (PI)				____	.881**	.949**
11. Unity (PI)					____	.952**
12. **Total CEQS**						___
(PI)						
Mean	7.50	7.73	7.67	7.73	7.70	7.67
Standard Deviations	1.56	1.53	1.52	1.50	1.55	1.46

Note: N= 395. ** $p < .05$.

Table 7
Correlations Between Pre- and Post-Injury CEQS Subscales and Total Scores

Time 2 (Post Injury)	Time 1 (Pre- Injury)					
Variables	1 Ability	2 Effort	3 Persist	4 Prep	5 Unity	6 **Total**
7. Ability (PI)	.739**					
8. Effort (PI)		.742**				
9. Persist (PI)			.746**			
10. Prep (PI)				.757**		
11. Unity (PI)					.751**	
12. **Total CEQS (PI)**						**.785****

Note: N=395. ** $p < .05$.

Table 8
Fixed Effects Estimates for Models of the Predictors of Collective Efficacy Total

	Model 1				Model 2				Model 3			
Parameter	Estimate	SE	*t*	*p*	Estimate	SE	*t*	*p*	Estimate	SE	*t*	*p*
Time (Level 1)	0.496	0.05	10.83	.000	0.495	0.05	10.79	.000	0.495	0.05	10.79	.000
Athlete (Level 2)												
# of Years					-0.087	0.05	-1.62	.107				
Current Status												
Injured					0.277	0.14	2.03	.043	.219	0.13	1.657	.098
Injury					-0.159	0.13	-1.25	.213				
Team (Level 3)												
NCAA Division					-0.284	0.29	-0.98	.346				
Performance					-1.100	0.31	-3.56	.003	-1.045	0.30	-3.49	.003
Gender					-0.163	0.30	-0.55	.591				

Note: Time= post-injury was used as the reference. #of Years =Number of years played on the current team. Current Status = Current participation status recoded with "healthy and participating/not participating for non-medical reasons," as the reference (1= Injured players both not participating and participating with restrictions, 2= healthy/non-medical). Injury= experienced an injury during collegiate playing career (1=yes, 2=no/reference). NCAA Division= Team NCAA division association with Division I as the reference criteria. Performance= performance record at time of data collection with winning and neutral records as the reference. Gender= females were used as the reference.