EXPLORING THE RELATIONSHIP BETWEEN CHEERLEADING INJURY, COPING SKILLS, AND ATHLETE BURNOUT WITH PERFORMANCE

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Daysha Shuya, candidate for the degree of Master of Science in Kinesiology & Health Studies, has presented a thesis titled, *Exploring the Relationship Between Cheerleading Injury, Coping Skills, and Athlete Burnout with Performance*, in an oral examination held on August 5, 2014. The following committee members have found the thesis acceptable in form and content, and that the candidate demonstrated satisfactory knowledge of the subject material.

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ABSTRACT

Cheerleading is transitioning from a dance-like activity to an acrobatic, gymnastic-like sport. In the process, injuries have increased substantially, including higher rates of catastrophic injury. To date, no studies have addressed the psychological wellness of performers in relation to injury rates among cheerleaders, or used these psychometric measures over short time-frames. This study has two main objectives. Objective #1 is to explore the difference in scores between the Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001) and the Athletic Coping Skills Inventory-28 (ACSI-28; Smith, Schutz, Smoll, & Ptacek, 1995) over a short duration, high-intensity performance time-frame. Objective #2 is to explore the possible relationship between psychological variables from the ABQ and the ACSI-28, in terms of injuries, over a short period, high-intensity time-frame to see if they are related to: performance errors and injuries. These objectives were accomplished with a prospective study of injury surveillance using descriptive data from psychometric questionnaires for a cheerleading team of 37 athletes (8 males, 29 females) from the Canadian Football League (CFL) with a mean age of 22.2 years. The team was followed over a high intensity, 4-day performance schedule, using the ABQ and the ACSI-28 that were completed pre- and post-performance, to explore a possible relationship between short-term changes in the psychometric ratings of burnout and coping with performance. Performance was measured by tracking rates of performance error and injury during the 4-day intensive performance schedule. During the football game event, 20 errors were noted, involving 40 athletes and
causing injuries. The number of injuries increased each day for the 4-day schedule (Day 1 = 2 injuries, Day 2 = 3 injuries, Day 3 = 4 injuries, Day 4 = 5 injuries). Paired t-tests were used to compare the changes pre- and post-psychometric measures, with statistically significant changes found in the athletes’ perception of coping with adversity \( t = 2.2; p = .05 \) and freedom from worry \( t = 2.6; p = .02 \). No statistically significant changes were seen in athlete burnout, though the athletes scored higher than average for each subset, compared to normative values at Time 1. Emotional and physical exhaustion levels increased (Time 1: \( M = 2.4, SD = .82 \); Time 2: \( M = 2.7, SD = .64 \)); however, the athletes reported an increased sense of accomplishment (Time 1: \( M = 2.0, SD = .53 \); Time 2: \( M = 1.9, SD = .40 \)) after completing the 4-day intensive performance schedule. In this study, athlete errors and safety risks increased during the high volume performance schedule. Little change occurred in the psychometric variables pre- and post-performance, but a correlation was seen between the pre- and post-testing of the ABQ \( r = .82 \) and in comparing the ABQ with the ACSI-28 \( r = .49 \).
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INTRODUCTION

Cheerleading is an activity that is gaining more public attention, not only for the substantially increasing number of participants, but also for the unfortunate incidence of catastrophic injury resulting from the activity. Cheerleading has “evolved from a motivational support role into an activity demanding high levels of skill, athleticism, and complex gymnastic maneuvers.” (Boden & Jarvis, 2008, p. 75). Unfortunately, the safety standards and training methods have not evolved with the same pace (Jacobson, Redus, & Palmer, 2005).

In Saskatchewan, 620 athletes participated in the 2008 provincial elementary and high school cheerleading competition. In 2009, the number increased to more than 850 athletes (M. Potts, personal communication, March, 2009). The sport has continued to grow with three dedicated cheerleading gymnastics training facilities opening in Saskatchewan, resulting in 1,500 to 1,600 athletes participating in cheerleading. More than 1,200 cheerleaders were expected to register for the provincial competition in 2012 (M. Potts, personal communication, October 2, 2011).

Injury and Cheerleading

The United States of America (U.S.) Consumer Product Safety Commission has estimated that in the U.S., 4,954 hospital emergency room visits occurred in 1980, 16,000 visits in 1994, 22,603 visits in 2002, and 26,789 visits in 2009, which were related to injuries sustained while cheerleading.
(Mueller & Cantu, 2003; Mueller, 2009). In 2009, 15.1% of the 26,789 injuries were sustained to the head and/or neck. Because the U.S. National Collegiate Athletic Association (NCAA) does not classify cheerleading as a sport, routine injury data is not collected on a regular basis. Until 2009, few published studies (Boden, Tacchetti, & Mueller, 2003; Fort & Fort, 1999; Jacobson et al., 2005; Luckstead, Satran, & Patel, 2002; Schulz et al., 2004; Shields & Smith, 2005) have documented cheerleading injury rates. The U.S. National Center of Catastrophic Sports Injury had received 39 reports of cheerleading incidents between 1982 and 2002. “Catastrophic injury is defined as any severe injury incurred during participation in a school- or college-sponsored sport.” (Mueller, 2001, p. 313). Boden et al. (2003) investigated the cheerleading data and reported an incidence level of 1.95 direct catastrophic injuries per year, or at the time of their publication, 0.6 injuries per 100,000 participants. College cheerleading injury rates were five-times higher than those at the high school level. In determining the cause of injuries, nine of the reported injuries were from pyramid skills and eight were from basket toss skills. Two injuries resulted in deaths. In a study looking at training factors and injury rates of American division 1A cheerleading teams, almost half of the participants who were surveyed had experienced an injury in the previous season (Jacobson et al., 2005). According to Jacobson et al. (2005), medical doctors ascertained that 40% of the cheerleading injuries assessed in their clinics eventually required surgery. Of the cheerleaders at the division 1A level who were surveyed, 78% admitted to having at least one cheerleading injury during their careers. These statistics are
not surprising, since teams often practice an average of 205 days per year, and over 50% of the team practices last at least two and a half hours. Ankle injuries were reported to be the most common (44.9%), followed by wrists/hands (19.3%), and head and neck injuries (10.2%; Jacobson et al., 2005).

In 2009, a closer look at cheerleading injury epidemiology was undertaken by the Research Institute at Nationwide Children’s Hospital in Columbus, Ohio. Cheerleading injury data were collected on the injury rates from exposure data, based on the type of team and event. The data were categorized into stunt-related injuries and fall-related injuries (Shields, Fernandez, & Smith, 2009; Shields & Smith, 2009a, 2009b) using the Cheerleading Reporting Information Online (RIO) surveillance tool over a one-year period between 2006-2007.

The criteria used by Shields and Smith (2009a) operationalized injuries according to three components. Reportable injuries had to: (a) occur as a result of organized cheerleading activity, (b) stop the cheerleader from the current participation due to the injury severity, and (c) require the cheerleader to seek medical attention. For medical attention to be considered as a treatment, it had to be either provided at the scene or at a health care facility, be administered within two weeks of the injury, be administered as a result of the injury, or be administered by an approved health care provider/trainer.

Shields, Fernandez, and Smith (2009) studied the various components involved in cheerleading, looking for differences in injuries between age groups and competitive levels. They found that All Star cheerleaders were more likely to
sustain either a joint dislocation or a bone fracture. Collegiate cheerleaders were more likely to experience a closed head injury or concussion, and almost all of the head and brain injuries occurred during acrobatic stunting. Of the 9,022 cheerleaders from 412 American cheerleading teams that were enrolled in the study, 567 injuries were reported. Of these, 83% occurred during practice, and 60% were the result of acrobatic stunts. Of the 567 injuries, 79 (13.9%) were fall-related. Although not applicable to the current Canadian health care system, the calculated average cost per cheerleading injury in American high schools was US$ 465 in medical cost, US$ 1,640 in human capital cost, and US$ 7,366 in comprehensive costs (Knowles et al., 2007).

**Injury Prevention**

Due to the documented increase in injury risks and perceived athlete expectations over the years (Mueller, 2001; Shields & Smith, 2009a), recommendations were made for cheerleading conditioning and training demands to be viewed like gymnastic-type conditioning and training demands (Luckstead et al., 2002). Spotters, or an extra person to assist in catching the cheerleader from the air, are placed to provide extra safety for higher risk stunts (Boden et al., 2003). Restrictions are also placed on the height of pyramids, and basket tosses are limited to four people throwing one person, instead of five people throwing one person. Teams are also no longer allowed to use any external equipment (e.g., mini-trampolines or platform boards) during competition. Modifications or limitations to acrobatic stunts during rainy or wet conditions (Boden & Jarvis, 2008) were also suggested for athlete protection.
Coaching safety and education has become mandatory in most of the U.S., though in Canada, the rules are less strict (M. Derry, personal communication, February 21, 2009). Interestingly, Shields and Smith (2009b) found no difference in injury rates based on the level of coach education or first aid awareness. Unfortunately, no specific method is available for studying injury causation and prevention, and a variety of models have been used (Krosshaug, Anderson, Olsen, Myklebust, & Bahr, 2005).

**Injury**

To discuss methods of injury prevention (Figure 1), the characteristics of an injury and possible causes need to be understood (Bahr & Krosshaug, 2005). Human *injury* is sustained physically, psychologically, or emotionally when tissues or the nervous system is pushed beyond physiological limits, resulting in damage or loss of homeostasis (McIntosh, 2005). Mechanical force can cause tissue damage and disruption, which can limit load and function. McIntosh (2005) discusses the need to use an integrated approach to injury causation since biomechanical or force-load descriptions are insufficient on their own. Factors such as competition, motivation, cognition, and perception are also considered with the training progressions and performance.
Figure 1. Four Step Sequence of Injury Prevention Research.

Injury Risk Factors

Although substantial biomechanical forces are placed upon the body during sporting activity, difficult movements can be replicated on several occasions without causing injury. “It is clearly important to consider athlete, environmental, situational, and biomechanical factors at the time of any injury.” (Meeuwisse, 2009, p. 1). An athlete brings a pre-determined number of risk factors to the sport, described as intrinsic risk factors. The *dynamic recursive model* of etiology in sport injury (Figure 2), considers these factors to be age, neuromuscular control, previous injury, and strength (Meeuwisse, Tyreman, Hagel, & Emery, 2007). The model has been countered by the *comprehensive model for injury causation* (Figure 3), which elaborates on the intrinsic factors to include: age, sex, body composition, health, physical fitness, anatomy, skill level, and psychological factors (Bahr & Krosshaug, 2005) as being predisposing factors for injury. The comprehensive model for injury causation adds to the dynamic recursive model of etiology in sport injury by combining the components from McIntosh’s (2005) schematic injury model, thus adding a psychological component to the biomechanical foundation.
Figure 2. The Dynamic Recursive Model of Etiology in Sport Injury.

Figure 3. A Comprehensive Model of Injury Causation.

From a physiological perspective, athlete self-care is important for injury prevention. Nutrition, hydration, and sleep can all affect performance. Proper nutrition will provide the necessary energy resources, hydration helps to maintain cognitive functioning, and sleep is essential for restoring the nervous system and maintaining homeostasis of the body. Sleep, memory, and performance are causally related, as sleep deprivation can alter neural plasticity and memory consolidation (Samuels, 2008). Halson (2008) provides a summary of what can happen to performance because of sleep deprivation, which includes increased error and fatigue, as well as decreased decision-making and power. Along with the importance of fulfilling sleep requirements for performance and memory consolidation, education is also important with regards to the necessity of sleep and in allowing schedules to include adequate time for sleep, both to promote good health and prevent injury.

In 2009, the NCAA participated in a hydration study of college athletes, and found that a significant number of athletes entered physical activity and team practices while in a hypo-hydrated state (Volpe, Poule, & Bland, 2009). “Water is the medium of circulatory function, biochemical reactions, metabolism, substrate transport across cellular membranes, temperature regulation, and numerous other physiological processes” (Armstrong, 2007, p. 575). Proper hydration is essential for the body to function at a high level. Nutritional considerations for cheerleaders may be especially complex. With the aesthetic sports and activities, eating disorders can be prevalent (Waples, 2003). The power and force needed to lift and throw a person is substantial and energy
requirements are large for such high-intensity activities. The U.S. National Athletic Trainer’s Association Position Statement recommends that an administrative team approach be used to recognize disordered eating (Bonci et al., 2008).

In conjunction with physiological health, fitness and mental training are vital for the overall health and performance of athletes. Several psychological factors are also involved with injury risk prediction and potential causation (Galambos, Terry, Moyle, & Locke, 2005). “Without recognition and, on occasion, intervention, psychosocial stressors may precipitate injury and negatively impact rehabilitation and sport performance upon return to sport” (Nippert & Smith, 2008, p. 400). Nippert and Smith (2008) describe the psychosocial factors that may initiate a stress response as being a predisposition to injury. Dr. Mark Lafave (Lafave, Katz, & Butterwick, 2008) reviewed athletes' injury risk as part of the injury assessment paradigm in the Conceptual Model for Management of Athletic Injuries, which is a key step in preparing for possible injuries. A prudent coach should be aware of each internal risk factor that every athlete brings to the team. Ideally, during the off-season training, coaches should work with individual athletes to decrease the intensity of risk factors, and to minimize the exposure of athletes to risk of injury.

The second component of the injury causation model refers to the external risk factors. These include sport factors (e.g., sport association sanctions and rules), protective equipment, sports equipment, and the environment (Bahr & Krosshaug, 2005; Meeuwisse et al., 2007). In the past
several years, the rules governing cheerleading have become more stringent and specific in the attempt to decrease injury rates. Many provinces (Saskatchewan included) and U.S. states have begun adopting coaching safety and coach training education. The education is slowly becoming mandatory (Saskatchewan Cheerleading Association, n.d.).

The American Association of Cheerleading Coaches and Administrators (AACCA) provides safety recommendations for use in the U.S. to address the physical and environmental aspects of the activity (AACCA, 2009). Nevertheless, little attention has been directed to the physiological or psychological components of injury. In a study by Jacobson et al. (2005), basic information was collected on the collegiate training time demands, but no analysis of training programs was conducted. To date, no reports have been published about cheerleading athlete wellness, performance, and overall health.

**Psychology of Cheerleading**

Typically, cheerleaders are perceived as team motivators with positive attitudes. Although cheerleaders have become known for their stereotypical smiles and positive energy, underneath the happy façade, some may experience hidden emotions, injury, or a psychopathology that is masked by their role as motivators (Boden & Jarvis, 2008). From a coaching perspective, if an error or stunt fall occurs during a cheerleading performance or sideline routine, the cheerleader is coached to refrain from showing a negative reaction, as the cheerleader is still considered a performer in front of the audience. Cheerleaders are not expected to express negative emotions, or show an inability to cope or
frustration with other members of the team while at the sidelines or in front of the audience (N. Bidwell, personal communication, January 14, 2012). Cheerleaders are expected to suppress negative emotions while on the sidelines, due to their roles as performers. They are not encouraged to immediately decompress emotional situations, but instead are asked to wait until the audience has left and the performance is over. This could affect the remainder of their performance. In the literature, no studies could be found that have explored the psychological health of cheerleaders.

**Athletic Coping Skills**

For a satisfying sport experience involving a high level of personal performance, athletes need to be able to cope with performance stressors (Lazarus, 2000; Nicholls & Polman, 2007). Athlete success has been inversely correlated with psychopathology. For example, Raglin (2001) found that athletes with positive psychological characteristics and better mental health are more successful in sports. In comparing elite- with non-elite-level gymnasts, Waples (2003) found that the most commonly reported attributes for both successful and unsuccessful performance outcomes were psychological factors. Athletes with low athletic and pain coping skills reflect an inability to focus on pertinent information, to accurately make decisions regarding split-second physical maneuvers, and to adjust to impending physical challenges that could result in a predisposition to musculoskeletal trauma (Meyers, Stewart, Laurent, LeUnes, & Bourgeois, 2008, p. 993).
Simply stated, athletes with poor coping skills experience decreased performance. Considering the complexities of cheerleading stunt groups, the ability to make split-second decisions is paramount. As psychological coping skills have a clear effect on sport performance, use of an appropriate tool for measuring the psychological constructs is equally important. The Athletic Coping Skills Inventory (ACSI-28; Smith, Schutz, Smoll, & Ptacek, 1995) is such a tool.

The ACSI-28 (Smith et al., 1995) has been refined to measure psychological skills that are critical for success in sport performances, using athlete self-reporting. Psychological skill sets in the areas of coping with adversity, coachability, concentration, confidence and achievement motivation, goal-setting and mental preparation, peaking under pressure, and freedom from worry are addressed in the ACSI-28. When the composite score is evaluated, the summary can be used to indicate the level of athletic resiliency in a given athletic setting (Meyers et al., 2008).

Since its development, the ACSI-28 has been used to evaluate minor league baseball players (Smith & Christiansen, 1995), where physical skills were differentiated from psychological skills to determine performance. Nationally ranked soccer players were found to have greater coping skills by not responding to the opposing team or to verbal distraction (Junge et al., 2000). In addition, psychological differences between elite female gymnasts and non-elite gymnasts were measured with the ASCI-28 (Waples, 2003). The psychometric measure was adapted to the Greek language in studies of basketball players (Goudas, Theodorkis, & Karamousalidis, 1998). The relationship of collegiate
athletes to the performance measurements, using the ASCI-28, was compared to wellness (emotional, social, spiritual, intellectual, and physical dimensions) to indicate that athletes with higher wellness scores also had higher coping skills (von Guenthner & Hammermeister, 2007). Olympic developmental soccer athletes have been tested for performance enhancement and injury prediction using the ASCI-28 (Meyers et al., 2008). Over time, and through various research endeavors, the ASCI-28 has been found to be useful as a composite tool to measure overall athlete resiliency in specific sports settings, and with the seven subscales for competition coping indicators. As little research has involved coping skills and psychological measurement of cheerleading, in this study, the ACSI-28 was chosen for measurements in the different subscales, and to determine the overall summary score, as a composite indicator.

Using the ACSI-28 to determine baseline measures of athletes, the psychological skill sets can be further developed to assist athletes with their coping methods, and thus, improvements in performance (Smith & Christensen, 1995). In cheerleading, maximal individual performance levels are essential to team safety. If athletes are not coping with adversity, stress, pressure, injury, or lifestyle commitments, their performance may be affected negatively. A decreased level of performance also puts other team members at a greater risk of injury. For example, when the group performance leads to a bad catch during a basket toss, or a loss in concentration during a complex group skill, such as during a pyramid-building activity. The members of a cheerleading team are interdependent on one another for overall safety.
Athlete Burnout

With the progressive development of psychological skill sets, athletic performance can be effected by high levels of stress or training (Nippert & Smith, 2008) when recovery times are inadequate after prolonged, excessive training, and physiological and psychological stresses are placed on the athletes (Armstrong & Van Heest, 2002). With high stress, positive physiological adaptations fail to take place as intended. Instead of producing improved performance, strength, and endurance, the training can cause athletes to undergo reversed physiological changes, leading to chronic mal-adaptations and a loss of performance. No studies have quantified the length of time and intensity for the training to become maladaptive. In general, prolonged training times are suggested to result in complex negative conditioning, referred to as the overtraining syndrome (Armstrong & Van Heest, 2002). The literature is also unclear about a specific definition for negative overtraining. Terms such as: “overtraining syndrome,” “staleness,” “chronic fatigue in athletes,” “sports fatigue syndrome,” “unexplained underperformance syndrome,” and “burnout” may be used (Budgett et al., 2000). “Failure adaptation,” “training stress syndrome,” and “under recovery” (Nederhof, Lemmick, Visscher, Meeusen, & Mulder, 2006) have also been used to describe a condition of negative overtraining.

A delicate balance exists between positive overload and negative overtraining. Optimal training pushes athletes to their highest positive level of overload for improved peak performance, while still allowing an adequate physiological and psychological recovery time. The aim is to produce the
maximum positive adaptation and the greatest potential gain in performance (Kentta & Hassmen, 1998). The concept has been referred to as functional overreaching (FO; Nederhof et al., 2006). If the training is pushed beyond the healthy balance threshold, negative consequences can occur. If, after the recovery period, athletes are still fatigued and fail to achieve an improved performance, the increased training did not fulfill its purpose (called non-functional overreaching, NFO). NFO can be measured with a combination of tests, but usually, it is diagnosed by exclusion. No golden standard is available for such measurements (Meeusen et al., 2006). When athletes present with continued fatigue and decreased performance, they may have moved through the desired overreaching to the NFO syndrome.

Some of the most commonly reported symptomatic consequences of NFO syndrome include: poorer performance, severe fatigue, muscle soreness, overuse injuries, reduced appetite, disturbed sleep patterns, mood disturbances, immune system deficits, and concentration difficulties (Kentta & Hassmen, 1998). Plasma catecholamine levels at rest can be used to objectively diagnose the syndrome, though the method is not definitive (Hooper, MacKinnon, Howard, Gordon, & Bachmann, 1995). NFO syndrome also appears to have similar signs and symptoms as chronic fatigue syndrome and major depression (Nederhof et al., 2006), and has severe consequences. The period for recovery can extend through several years. The symptoms can be quantified psychologically and physiologically, but a diagnosis of NFO syndrome is only made if the symptoms
of fatigue, decreased performance, potential increased systemic infections, and depression are not resolved after two weeks of rest (Budgett, 1998).

All athletes will tolerate different individual levels of training. Variables such as general health level, fitness levels, stress from competition and life, diet, hydration levels, coping skills, as well as job and life commitments will influence how athletes react to specific levels of training (Budgett, 1998). Every athlete will also take an individualized amount of time to progress from positive overload to burnout, with different effects on performance.

Several attempts have been made to determine the markers of early overtraining syndrome (Halson & Jeukendrup, 2004; Hooper et al., 1995; Meeusen et al., 2006; Nederhof et al. 2006). Halson and Jeukendrup (2004) reviewed the literature before 2004, and noted that no scientific evidence could confirm or refute that NFO syndrome was an extension of overreaching in a non-functional manner. The authors stated that, "many of the physiological and biochemical responses to increased training are highly variable, with some measures in some studies demonstrating changes and others remaining unaltered" (p. 968). At the time of their study, diagnostic physiological markers were considered to be unreliable.

Later, Nederhof et al. (2006) published usable criteria for developing markers for NFO syndrome. According to the authors, the markers should be: objective, non-manipulatable, applicable in training practice, not too demanding for athletes, affordable for the majority of athletes, and based on a sound theoretical framework. The authors presented preliminary evidence that
psychomotor speed could be a promising early marker for NFO syndrome since the psychomotor tests were computerized and fulfilled the above criteria. The authors determined the face validity for the psychomotor tests by demonstrating that over-trained athletes often report concentration difficulties, cognitive complaints, and memory problems as part of their symptoms.

The European College of Sport Sciences task force presented a position statement (Meesuen et al., 2006) on the prevention, diagnosis, and treatment of full-blown NFO syndrome. A diagnostic checklist of fatigue symptoms, pathologic exclusion criteria, potential training error causation factors, and confounding psychological, social, and time zone travel variables, as well as exercise test comparisons are part of the diagnosis of exclusion. Although the checklist is thorough, it requires athletes to have progressed fully into the NFO syndrome and it is not sensitive enough to predict overtraining from an early state of overreaching. Identifying athletes early in the stages of overtraining is crucial for minimizing the amount of rest and healing time required for athletes to return to a healthy state and athletic competition. The current literature does not indicate how these changes can be detected. Working with varsity rowers, Nederhof, Visscher, and Lemmink (2008) related psychomotor speed to perceived performance. Building on the work of Rietjens et al. (2005) and Tergau et al. (2000), the authors used psychometric testing and central fatigue as sensitive early markers of overtraining, and were able to define a significant relationship between reaction time (based on the psychomotor test) and perceived
performance (based on the Athlete Burnout Questionnaire; Nederhof et al., 2008).

The Athlete Burnout Questionnaire (ABQ; Raedeke & Smith, 2001) was developed to provide a psychometrically sound measure for detecting and understanding burnout in athletes. Based on the Maslach Burnout Inventory (MBI; Maslach & Jackson, 1984), the ABQ was adapted for sports and athletes. Maslach and Jackson (1984) initially developed a burnout inventory based on jobsite and workplace demands, which was later adapted to different working environments in several countries (e.g., Green, Walkey, & Taylor, 2001). Raedeke (1997) published the first ABQ, committed to the sport perspective. In the initial study of swimmers, the operational definition of burnout for sport was adapted to contain a three-dimensional construct including: emotional/physical exhaustion, reduced sense of sport accomplishment, and devaluation of sport.

The three dimensions of burnout in the ABQ (Raedeke & Smith, 2001) serve as significant indicators of performance. When athletes experience emotional/physical exhaustion, from intense demands of training and competition, their desire to continue decreases. In cheerleading, because of the intergroup complexities, all participants in every acrobatic stunt must perform at the highest level possible. A reduced sense of accomplishment would indicate unmet goals and expectations (Raedeke & Smith, 2001). In cheerleading, all members of the team must work together for complex pyramid skills and group stunts to be safe. Not meeting individual performance goals not only affects the safety of the individual, but the safety of the entire acrobatic stunt group.
Devaluation of sport is a measure of sport performance, in contrast to the MBI (Maslach & Jackson, 1984) depersonalization dimension that reflects workplace humanity. The measure is indicated by a loss of interest, desire, and caring about the sport, which in cheerleading, can also affect the safety of other team members. The three subsets measured in the ABQ are highly applicable for identifying injury prevention.

Initially, in development of the ABQ (Raedeke, 1997), seven questions covered each of the three dimensions. The questions were based on the operational definition of burnout across the three dimensions, and internal construct validity was determined. Later, Raedeke and Smith (2001) added stress and motivation-related variables to further adapt the burnout inventory to athletes in three studies. The first study focused on the development of each item, which involved a small sample of graduate students to clarify wording and perform a statistical factor analysis for the content and the three dimensions. Reliability and construct validity became the focus of the second study, which found evidence for the psychometric properties of the instrument. Psychometric measures for burnout, stress, coping, social support, enjoyment, and motivation were given to 244 American swimmers (between 14 and 19 years of age), to determine the relationship between burnout, entrapment, and motivation. After using alternative model testing and confirmatory factor analysis, the three-factor burnout model and subscales, using 15 questions, “correlated positively with stress, trait anxiety, and amotivation, and correlated negatively with coping, social support, enjoyment, commitment, and intrinsic motivation indices.”
The third study determined the transferability of the ABQ to different sports and other age groups, with an analysis of test-retest reliability. For this study, 208 athletes (mixed male and female, from 7 different university sports and of varying ethnicities in 4 American colleges, from 2 divisions in various stages of their 5 years of education) were tested for burnout using the ABQ along with other psychometrically sound questionnaires for competitive trait anxiety, enjoyment, commitment, and motivation. Good test-retest reliability was confirmed after a cross-country track team was followed through practices over seven to nine days. Consequently, the ABQ was used to identify early burnout signs and later-season full-burnout symptoms (Cresswell, 2008) as a reliable way of identifying athletes before their symptoms become unmanageable. In comparison, the results from Quested and Duda (2011) had the following mean scores for the ABQ given to 219 elite dancers early during the dance season: devaluation ($M = 1.76$, $SD = 0.7$); emotional/physical exhaustion ($M = 2.66$, $SD = 0.87$) and, reduced sense of accomplishment ($M = 2.32$, $SD = 0.73$). The athletes in the study by Raedeke and Smith (2001), if used for normative data, had mean scores of: devaluation ($M = 2.19$, $SD = 0.95$), emotional/physical exhaustion ($M = 3.06$, $SD = 0.82$) and, reduced sense of accomplishment ($M = 2.30$, $SD = 0.79$).

**Cheerleading Performance**

Most of the literature examining the link between psychological factors involved with performance (i.e., burnout and injury) considers sports over entire seasons. No research, to date, has considered coping skills or burnout over
short and intensive time-frames, such as during competitions. An understanding of these relationships would be important for exploring the continual, high-level performance in cheerleading, especially in terms of injury prevention and safety of the athletes. Considering the high catastrophic injury risk of group acrobatic stunt skills (i.e., pyramids and basket tosses), athletes must be trained for peak performance, and be able to maintain the high performance levels at all times. These skills are essential in order to prevent injury either to oneself or to other members of the team. If individuals experience poor concentration, detachment from the sport, decreased ability to cope, high sport-specific stress levels, overtraining, or burnout symptoms, even momentarily during complex skills, a higher risk is present for the individual and for the rest of the group. The relationships between injury and poor performance are particularly important during the highly intense, short-term competitions or training sessions, when cheerleaders are learning difficult skills, choreographing new routines, and competing against other teams. Without the means to measure when cheerleaders’ safety indicates higher-risk, coaches may continue the training sessions unnecessarily.

The popularity of cheerleading seems to be increasing. If the recommendation to classify cheerleading as a sport is followed, it could allow for sanctioned by the NCAA and governance through sport authorities (Mueller, 2009). By determining the psychological and physiological variables related to health, wellness, and performance, interventions could be applied to reduce the rate of injury from cheerleading.
Objectives

The first objective of this thesis is to explore the differences between scores for the ABQ, ACSI-28, and performance errors before and after a 4-day, intensive performance schedule. The first hypothesis is that changes in the psychological variables and quality of performance can be identified over a short duration, high-intensity time-frame. More specifically, the athletes are expected to perceive more burnout from the intensity of the schedule, and be less able to cope thus showing decreased performance due to the high level activity in a short time-frame.

The second objective is to examine whether or not psychological variables can predict performance errors and injuries over the intensive 4-day schedule. To explore this, the psychological variables from the ABQ and the ACSI-28 (pre- and post-competition) will be used to see the possible relationships between (a) performance/errors and (b) injuries in the short time-span. Changes in the variables from the ABQ and the ACSI-28 are hypothesized to indicate a relationship between performance/errors and injuries over the short time-span.

Limitations

This thesis will only address the psychological components with regards to injury prevention. Although physiologic data would have been beneficial, the practicalities of field research and the high media profiles of the participants made the inclusion of physiological tests impractical. An attempt was made to
collect the athletes’ sleep records, along with hydration and nutrition logs, but because of the intensity of the schedule, this aspect was not feasible.
METHOD

The purpose of the research was to examine the psychological variables of coping and burnout before and after an intensive training and performance schedule. The chosen method was a longitudinal design that was observational (with regards to injury surveillance and performance errors), and non-experimental (with no manipulation of the variables for injury rate, burnout, and athlete coping skills). Data were gathered during two testing times: before a 4-day intensive performance schedule and after the four days of performances.

Participants

Participants were recruited from a cheerleading team associated with a football team that is part of the Canadian Football League (CFL) professional organization. Eight cheerleading teams are currently in the league, with cheerleading team sizes ranging from 20-40 athletes. Of the eight cheerleading teams, only three teams had acrobatic stunting cheerleading components in their 2009 season. The team in this study was chosen because of its location to the researcher and because it was in the process of transitioning away from the traditional dance-style to the more modern acrobatic-style of cheerleading. The acrobatic stunting component has more risks and a potential for greater rates of injury. The CFL organization requires that members of a cheerleading team, as used in this study, must volunteer their time, be over 19 years of age, be committed to fundraising and promotional events, attend all regular season and playoff games, and be available for training and conditioning from March until the
end of November. The cheerleading team manager and head coach considered prior acrobatic cheerleading experience as an asset, but not a requirement to be part of the team. The manager and coach chose both males and females for the team. The teams perform at an elite, professional level, and these expectations were explained to the athletes during the interview process to ensure the demands of the organization were understood. Participants were excluded from the team if they were found to have any signs of unsafe or unhealthy medical conditions during the health screening, which would reduce their ability to complete the activities.

During the CFL football season in Saskatchewan, 38 cheerleaders were members of the 2009 team. The 8 males had an average age of 24 years ($SD = 4.3$ years); their average height was 175 cm ($SD = 26.8$ cm); their average weight was 70 kg ($SD = 1.36$ kg); and an average Body Mass Index (BMI) of 35.6 ($SD = 4.1$). The 30 females had an average age of 22 years ($SD = 2.5$ years). They were divided into acrobatic stunting positions of flyers (who stand at the top of the acrobatic stunts in flexible positions and are thrown up into the air), thirds (who stand behind the acrobatic stunt groups and provide assistance in lifting, balancing, and supporting), and bases (who do the lifting and holding of the flyers at shoulder height or above their heads). The bases had an average age of 21 years ($SD = 3.0$ years); height of 137 cm ($SD = 7.1$ cm); weight of 65 kg ($SD = 1.5$ kg); and an average BMI of 22.6 ($SD = 2.0$). The thirds had an average age of 22 years ($SD = 3.1$ years); height of 141 cm ($SD = 15.5$ cm); weight of 69 kg ($SD = 1.2$ kg); and BMI of 20.8 ($SD = 1.9$). The flyers had an
average age of 22 years \((SD = 2.7\) years\); height of 118 cm \((SD = 7.6\) cm\); weight of 63 kg \((SD = 1.3\) kg\); and BMI of 20.6 \((SD = 1.4)\).

**Procedures**

As the researcher was also the team physiotherapist, contact with the team during the season began at the team try-outs and continued until the completion of physical therapy rehabilitation of injuries. Due to changes in team membership, issues with the coaching staff, and the practicalities of field research, the data could not be collected for the entire season as originally intended. However, at the end of the season, the possibility arose to collect data over an intensive 4-day performance schedule. It is this latter data that became the focus of this thesis.

In general, the research procedures cover: (a) the application and approval from the ethics committee; (b) pre-season health screening; (c) the intensive 4-day performance schedule (i.e., the context of the research); (d) the measures used for the data (i.e., athlete burnout, athlete coping, injury data, and performance data); and (e) the procedures used for collecting the data.
**Consent and ethics committee approval.** Ethics approval was obtained from the University of Regina Research Ethics Board (see Appendix A). The researcher attended the cheerleading team’s initial practice and explained the intent of the research study to the team at the beginning of the season. Informed consent was obtained (see Appendix B) and the researcher was available to answer all questions and concerns from members of the cheerleading team and organizational staff. Because the researcher was also the team sport physical therapist, she was blinded to which athletes chose to participate. If an athlete decided not to participate in the study, no bias in treatment or care was shown to that athlete for the remainder of the season.
Pre-season health screening. The team underwent a pre-season health screen adapted for cheerleading from mainstream sports. The basic pre-season medical and health screen is shown in Appendix C. The team was medically screened to detect possible contra-indications for the acrobatic stunting and physical activity components of cheerleading at the team try-outs. Team demographics and basic health information were collected using individualized health assessments by the researcher, as the team sport physical therapist. If an unregulated health condition was identified from the screening, prompt medical referrals were initiated, with the safety of the individual for the sport to be determined by the organization. The health screen covered possible intrinsic risk factors for injury (Bahr & Krosshaug, 2005), allowing the coach and sport physical therapist to identify pre-existing injuries that required treatment or activity modification before the start of the season. From the screening, basic health data were collected for calculating the cheerleaders’ BMIs.

Following the pre-season health screen, one athlete was found to have unexplained back pain. She was referred to her physician and left the team (due to pregnancy). Several athletes had biomechanical deficits from previous injuries that were not mentioned on the subjective portion of their health screen. The team sport physiotherapist and the strength and conditioning coach put together rehabilitation programs for these athletes. After reviewing the BMI data, one athlete, who had an unhealthy low value was referred to a sports nutritionist, and after six weeks, her BMI returned to a normal value. Two athletes had unusually high BMIs, and were referred to sports nutritionists. The team strength and
conditioning coach also modified their training routines. Their levels returned to healthy values after 10 and 12 weeks, respectively.

**Intensive performance session (research context).** During the 4-days of the study, the team was expected to participate in a high-stress, intensive performance schedule in preparation for the annual Grey Cup Festival and CFL Championship game. The performance venues were to occur in the downtown core of the city, where the warm-up areas were inadequate, crowd control was poor, and stage sizes and heights varied significantly. Meal breaks were also infrequent, and hydration stations were limited.

The 4-day schedule included:

Day 1 (15 hours): no meals provided, opportunity for 7 hours of sleep, 2 venues
- 7:00 a.m. – departure and travel by bus; 9 hour travel time
- 8:55 p.m. - performance
- 9:20 p.m. - performance
- 10:30 p.m. – return to hotel

Day 2 (15.5 hours): lunch and supper provided, opportunity for 6 hours of sleep, 4 venues
- 8:00 a.m. - start
- 9:00 - 11:00 a.m. - rehearsal
- Lunch
- 12:00 noon - 1:30 p.m. - performance
Day 3 (16 hours): breakfast provided, opportunity for 6 hours of sleep, 7 venues

- 7:00 a.m. - start
- 8:30 a.m. - performance
- 9:00 a.m. - breakfast
- 10:00 a.m. - 1:00 p.m. - performance
- 2:00 - 4:00 p.m. - rehearsal
- 6:50 p.m. - performance
- 7:30 p.m. - performance
- 8:45 p.m. - performance
- 10:00 p.m. - performance
- 11:00 p.m. - return to hotel

Day 4 (12 hours): no meals provided, 1 venue (outdoor stadium; primary performance)

- 7:30 a.m. - start
- 8:00 a.m. - 12:00 noon - rehearsal
- 3:00 p.m. - 7:30 p.m. - game
- return to hotel
Essentially, the team was in a situation that was highly physiologically and potentially psychologically stressful, with minimal opportunities for sleep, and all the while expected to perform flawlessly. Because of the requirements for physical appearance (i.e., hair styling and make-up), female cheerleading team members were expected to spend one or two hours each morning in preparation for the day’s activities (included within their opportunity for sleep time). The team boarded their bus and began performances at hotel meeting rooms, outdoor parks (below freezing temperatures), conference centers, and media locations. Performances rarely ran according to schedule, and team members needed to be cognizant of unruly inebriated fans that often tried to jump into the performances, trying to catch the flyers while performing. Limited storage space was available for the team members, who usually carried all of their belongings to each location in the city. Maintaining adequate hydration was difficult and meals were often lacking. The cheerleaders usually purchased their own food from fast-food establishments while travelling to the next performance.

**Instruments for data collection.** The team was provided with the ABQ (Raedeke & Smith, 2001) and the ACSI-28 (Smith et al., 1995; see Appendix D) before and after the 4-day intensive performance schedule.

**Athlete burnout.** The ABQ (Raedeke & Smith, 2001) is an 18-item self-reporting inventory with three subscales (emotional/physical exhaustion, reduced sense of accomplishment, and devaluation of sport). It uses a 5-point Likert
scale (1-Almost Never to 5-Almost Always) for respondents to indicate how frequently they felt or thought in a certain way. From three studies (see Raedeke & Smith, 2001) the measure was found to be psychometrically sound, with a good construct validity and reliability when used with adolescents and young adults in a variety of competitive sports. The “initial version of the ABQ was examined and refined, and followed by efforts to assess its construct validity and generalizability” (Readeke & Smith, 2001, p. 302). The measure also has good test-retest reliability for the three subscales, with $r = 0.92$ for emotional/physical exhaustion, $r = 0.86$ for reduced sense of accomplishment, and $r = 0.92$ for sport devaluation.

**Psychological coping skills.** The ACSI-28 (Smith et al., 1995) is a 28-item self-reporting inventory with 7 subscales, using a 5-point Likert scale (1-Almost Never to 5-Almost Always) for respondents to indicate how frequently they have felt or thought in a certain way. If the mean value of a subset increases during consecutive testing, the coping ability of the subset would decrease, thus, demonstrating an inverse relationship. This tool is regarded to be a psychometrically sound and useful instrument for self-perceived assessment of an athlete’s ability to: (a) cope with adversity, (b) be coached, (c) concentrate, (d) be confident in the sport and have achievement motivation, (e) set goals and be mentally prepared, (f) peak under pressure, and (g) be free from worry. The overall composite score can be calculated and suggested as an overall measure of resiliency. Confirmatory factor analysis provided validation for the ACSI-28 instrument (Smith et al., 1995). Meyers et al. (2008), summarized
the internal consistency of the instrument to a Cronbach $\alpha = .62$ to .88, test-retest reliability $r = .47$ to .87, degree of social desirability using Marlowe-Crowne as $r = .19$ to .43, with parsimonious/comparative goodness-of-fit as Muliak PGFI = .75 and Bentler CFI = .91. The traditional goodness-of-fit indices were used for confirmatory validity of the instrument, and all factor loadings were significant at $p < .001$ (Waples, 2003).

**Division final playoff game performance observation.** The last game prior to the CFL Championship game that the team had the opportunity to attend was used for a comparison of performance. This game was not able to be determined at the beginning of the season, as it was dependent upon the league standings of the football team. The last game was chosen for comparison because at that time of the season, there would be no new choreography, stunting, or dance routines added to the team repertoire. The stunt groups would be well-defined and practiced, with the cheerleaders comfortable with the skills in each of their groups. The team would also have the ability to experience their personal sleep, hydration, and nutrition requirements, as they would be at their home stadium with a regular routine. There would still be psychological stressors and pressure for high-levels of performance, as this game would be televised and was very important to the football team to earn its berth to the Championship final game.

**Performance errors.** In order to compare the performance after the 4-day intensive performance schedule at the Championship game, performance errors and injuries were recorded at the division final playoff game. The
researcher recorded errors and falls during the division final playoff game and for all performances leading up to and including the Championship game at the end of the 4-day intensive performance schedule. The researcher has experience as an acrobatic cheerleader, and as a previous member of the team. She was able to note the errors and falls based on former participation as a flyer on university and CFL acrobatic cheer teams. After documenting the findings, the team manager and the head coach verified the researcher assessments at the end of each day. An error was defined as any notable movement that was not part of the choreography. Incorrect arm positions, missed or forgotten steps, moving to an improper location, or a stunt that was not executed as choreographed, but was safely caught with control, are examples of errors. A fall was defined as a stunt that was not executed properly and could not be safely caught, or the individual was not caught in a controlled manner. The number of errors and falls were combined to calculate the final number of performance errors.

Measurement of injury. During the 4-day intensive performance schedule, injuries sustained to team members were documented. Injury was operationalized according to the Report Injuries Online criteria (RIO; Shields, Fernandez, & Smith, 2009). According to the RIO criteria, for an injury to be documented, it must happen during a cheerleading activity, require the athlete to miss the rest of the activity, and require the athlete to seek first-aid or medical treatment.
Procedures for data collection. Performance errors and falls were documented at the division final playoff game, over the 4-day intensive performance schedule, and during the championship football game, as described in the previous section. Consistency was maintained as the team used pre-choreographed routines that were repeated during the playoff game, all performances during the four days, and during the football game. This diminished a learning effect. The researcher recorded the number of errors and falls, as well as injuries.

The ABQ and ACSI-28 were used to determine self-perceived burnout and coping levels, respectively, for the cheerleading team members prior to, and after, the 4-day intensive performance schedule. The scores from the psychometric questionnaires were analyzed for statistically significant changes over the four intensive days, to satisfy the first objective, and then tested for correlation with the errors and injuries, to answer the second objective.

Questionnaire distribution. The Time One questionnaires were distributed by the team manager to the participants while the cheerleading team was travelling to the 4-day intensive performance schedule. The Time Two questionnaire responses were collected while the team was travelling back from the 4-day intensive performance schedule on the day following the championship football game. Prior to distribution, the team manager randomly numbered the members of the team roster. When given the questionnaires, the participants were instructed to answer each question to the best of their ability, according to how they felt at that moment. They were asked to answer the
questions individually. After completing the questionnaires, the participants were asked to take the questionnaires to the front of the bus. The random number that had been previously assigned to each participant was written at the top of the questionnaire. The completed questionnaires were then sealed in envelopes with the corresponding random number from the roster page. The envelopes were not opened until after all physical therapy rehabilitation had been completed for the 2009 season, to ensure that researcher bias was not present during the period of rehabilitation. The blinding process was explained to the athletes on the bus.
RESULTS

The results are divided into three sections. The first section presents the descriptive statistics for all of the measured variables. The second section uses paired t-tests to determine any differences between the pre- and post-competition ABQ and ASCI-28 measures (i.e., the first objective). Finally, the third section presents the results of the correlation analyses for any relationship between the psychological variables and the performance errors and occurrences of injury.

Description of Variables

Athlete burnout. From Table 1, the mean scores for the subscales of athlete burnout at Time 1 ranged from 2.0 (SD = .53; reduced sense of accomplishment) to 2.4 (SD = .82; emotional/physical exhaustion). The Time 2 mean values ranged from 1.9 (SD = .40; reduced sense of accomplishment) to 2.7 (SD = .64; emotional/physical exhaustion). As stated previously, values close to the maximum value (5) indicate more burnout symptoms. On average, the participants reported mid to low levels of burnout before and after the intensive performance schedule.
Table 1

Descriptive and Comparative Statistics for the Time 1 and Time 2 ABQ and ACSI-28

<table>
<thead>
<tr>
<th>Subscale</th>
<th>Time 1</th>
<th>Time 2</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=24</td>
<td>n=15</td>
<td></td>
</tr>
<tr>
<td>Devaluation</td>
<td>0.85</td>
<td>2.1</td>
<td>2.1</td>
</tr>
<tr>
<td>Emotional/Physical Exhaustion</td>
<td>0.87</td>
<td>2.4</td>
<td>2.7</td>
</tr>
<tr>
<td>Reduced Sense of Accomplishment</td>
<td>0.7</td>
<td>2</td>
<td>1.9</td>
</tr>
<tr>
<td>Overall</td>
<td>0.89</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Athlete Burnout Questionnaire

| Subscale                                      | Time 1 | Time 2 | Comparison |
|                                               |        |        |            |
| Coachability                                   | 0.41   | 4.1    | 3.7        | 1.6       | 0.12 | 0.55 |
| Concentration                                  | 0.37   | 3.7    | 3.6        | 0.62      | 0.55 | -0.15|
| Confidence and Motivation                      | 0.33   | 4      | 3.8        | 1.9       | 0.09 | 0.3  |
| Coping with Adversity                          | 0.61   | 3.8    | 3.6        | 2.2       | 0.05*| 0.3  |
| Freedom from Worry                             | 0.55   | 3.2    | 2.9        | 2.6       | 0.02*| 0.58 |
| Goal Setting and Mental Prep                   | 0.71   | 2.8    | 3          | -0.43     | 0.68 | 0.77 |
| Peaking Under Pressure                         | 0.54   | 3.4    | 3.7        | -1.5      | 0.12 | 0.64 |
| Composite                                      | 0.87   | 3.5    | 3.4        | 1.8       | 0.09 | 0.45 |

Note: *p < .05

Athlete coping skills. From Table 1, the mean subscale scores for athlete coping skills at Time 1 ranged from 2.8 (SD = .77; goal-setting and mental preparation) to 4.1 (SD = .57; coachability). The Time 2 mean values ranged from 2.9 (SD = .73; freedom from worry) to 3.8 (SD = .64; confidence and motivation). Again, the values which were closer to the maximum (5) reflected high coping levels (i.e., these would be desirable for the team). On average, the participants reported mid to high levels of coping skills. The mean composite value from the test at Time 1 was 3.5 (SD = .44) and at Time 2 was 3.4 (SD = .45). The composite value was the sum of all scores, which reflected moderate coping skills at both Time 1 and Time 2, with the scores at Time 2 being slightly lower than those at Time 1.
The division final playoff football game errors and injuries. A total of 1 performance error was observed, involving 3 athletes, throughout the entire game. There were no injuries sustained.

Errors and injuries during the 4-day intensive performance schedule.

The number of new injuries increased daily (Figure 4). Of all of the injuries, three required assessment by the team doctor and by the sport physiotherapist. The number of performance errors increased over the schedule, generally, with a slight dip on Day 3. The total number of injuries over the four days was 14, with 125 performance errors.
Figure 4. Injury and Error Rates.
The championship football game errors and injuries. A total of 20 performance errors were observed, involving 40 athletes during the game (9 errors involving 10 athletes, and 11 falls involving 30 athletes). A total of 3 injuries occurred during the football game: 1 concussion, 1 second-degree sprained ankle, and 1 heel contusion. The team doctor assessed the 3 injuries post-game. Both the coach and the team manager agreed with the researcher’s documentation.

Statistical Analysis of the Psychometric Measures.

For the statistical analyses, the SPSS software was used with the sample size of 10 athletes. Reliability was determined by calculating Cronbach’s alpha for the measures and their respective subsets. For the ABQ, the overall Cronbach alpha was 0.89. The three subset scores were: physical/emotional exhaustion ($\alpha = 0.87$), reduced sense of accomplishment ($\alpha = 0.70$), and devaluation of sport ($\alpha = 0.85$). In comparison, Readeke and Smith (2001) reported reliability for emotional/physical exhaustion ($\alpha = 0.88$), reduced sense of accomplishment ($\alpha = 0.84$), and sport devaluation ($\alpha = 0.87$). For the ACSI-28, Meyers et al. (2008) summarized internal consistency to be Cronbach $\alpha = .62$ to .88. In this study, the range for Cronbach $\alpha$ was = .33 to .71 for the subsets, with an overall $\alpha = .87$.

Differences between the pre- and post-psychometric measures were calculated using paired t-tests, to become aware of any change in the mean scores for each measure. Because burnout and coping skills are conceptually different constructs, the scores were calculated separately, using the dimensions
for each scale. Also, because the two constructs are not connected conceptually, no adjustment was made for errors due to inflation. Considering the exploratory nature of the study, and the small sample size ($N=10$), the paired t-tests were considered a reasonable starting point for the analysis (Table 1) and significance levels were set at $p < .05$.

Significant differences were found in the subsets of the ACSI-28 for *coping with adversity* and *freedom from worry*. The perception of being able to cope with adversity increased, and the participants' level of worry decreased in the second round of testing.

However, given the low reliability scores for the majority of the subscales, it was more appropriate to look at the composite score. While no significant difference was found between time 1 and time 2 testing, it was approaching significance ($p = .09$) despite the low sample size. As there was no differences found between time 1 and time 2 testing, this may be indicative of a flaw in either the testing measure, procedure, and/or data collection. One possible reasoning for the lack of relationships could be due to the low sample size.

**Statistical Analysis Comparing Psychometric Measures to Injury and Performance Errors**

To determine if any of the psychological variables (i.e., psychological burnout, perceived coping skills) were related to injury occurrence or performance errors during the four days, basic bivariate correlations were used. As described in Table 2, the relationship between pre- and post- burnout ($r = .82$) values was statistically significant. The correlation for the pre- and post-
ASCI-28 was not statistically significant. A negative correlation was found for the initial burnout and coping scales. Performance errors and injuries increased substantially from the playoff game to the championship game, but statistically, there was no relationship between the psychometric variables and the increase in errors or injuries when analyzed to the individual athletes.

<table>
<thead>
<tr>
<th>Variables</th>
<th>errors</th>
<th>injuries</th>
<th>ABQ pre</th>
<th>ABQ post</th>
<th>ACSI-28 pre</th>
<th>ACSI-28 post</th>
</tr>
</thead>
<tbody>
<tr>
<td>errors</td>
<td>1.00</td>
<td>0.18</td>
<td>0.07</td>
<td>-0.07</td>
<td>0.23</td>
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<td>injuries</td>
<td>-</td>
<td>1.00</td>
<td>-0.04</td>
<td>-0.28</td>
<td>-0.23</td>
<td>-0.19</td>
</tr>
<tr>
<td>ABQ pre</td>
<td>-</td>
<td>-</td>
<td>1.00</td>
<td><strong>0.82</strong></td>
<td>*-0.49</td>
<td>-0.32</td>
</tr>
<tr>
<td>ABQ post</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.00</td>
<td>-0.12</td>
<td>-0.30</td>
</tr>
<tr>
<td>ACSI-28 pre</td>
<td>-</td>
<td>-</td>
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<td>-</td>
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<tr>
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<td>-</td>
<td>-</td>
<td>-</td>
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<td>1.00</td>
</tr>
</tbody>
</table>

Note:*correlation is significant at the 0.05 level (two-tailed), **correlation is significant at the 0.01 level (two-tailed) N=16
DISCUSSION

The main purpose of this research was to examine the psychological variables of coping and burnout before and after a short duration intensive performance schedule by looking at the relationship between psychological score changes and physical injury rates. The research is concerned with the mind-body connection between performance and injury among cheerleaders, who have previously been shown to have a high rate of catastrophic injury (Shields & Smith, 2009a), while attempting to perform flawlessly. The secondary purpose was to use a whole-person health approach to look at cheerleading as it transitions from a dance-like activity to a gymnastic-like sport. With the transition, injury rates have increased (Boden et al, 2003), but little has been done in terms of education and injury prevention. To prevent injury, the mechanisms of the activity must be understood, and team managers and coaches must have the appropriate knowledge and preparation. In this study, intrinsic risk factors of injury (i.e., burnout and coping skills) were documented and analyzed in relation to injuries being sustained over a short time-frame. The basic physical and psychological health profiles of a cheerleading team in the CFL were documented, along with the injury rates during two professional high-intensity games. Due to the low sample size, the ability of the statistical analysis to make a fair representation of the actual population is limited. There were trends in the numbers, thus providing an opportunity to provide a description of the changes in lieu of quantitative numerical values that would represent population changes.
The researcher initially began to collect data throughout the entire season; however, due to various issues related to field research, an alternative plan was developed and the research was modified. As was just presented in the results section, this revision in the method resulted in data from a sample too small to make any sound statistical conclusions. However, given the unique characteristics of the population (i.e., a home playoff game, the ability to cheer a championship game, special permission for the research granted by the professional organization, the opportunity to study one of the two acrobatic stunting cheerleading teams in Canada, and the time of transition for cheerleading) the result allowed for the truly exploratory nature of this research. As the researcher was present for the entire weekend, had worked with the members of the team throughout the entire season, and had been a prior member of the team under the same coach, the data have been supplemented with first-hand knowledge and experience. From the researcher’s personal experience of watching the performances, attending to and treating the injuries, and participating previously as a flyer, the trends in the data will be discussed from a practical perspective despite the lack of statistical support. The following discussion will be presented more in the form of a narrative description of the weekend, supported by the numerical trends in the data.

**Injury and Cheerleading**

The members of the cheerleading team in this study had high levels of skill in cheerleading. They had participated in a complete, regular season of training, choreography, and performance at all of their home field football games.
At the time of this study, the team had performed acrobatic stunts together at numerous settings and locations for the previous eight months. The choreography in the performances and at the game had been practiced, without change, beforehand at regular season football games and at the time of this study. The home playoff game was a realistic control measure to document performance potential and injury rates for this group of athletes. The home playoff game was reflective of the team’s abilities and skill sets. It was not surprising or unexpected for the team to perform an entire game without an injury. Members of the team were able to prepare for the game in their usual manner, in their home city, as they had for the entire season. However, as the 4-day intensive performance schedule progressed, the injury rate steadily increased, concluding with a championship game with increased injuries and a high number of performance errors.
Injury risk factors. As the team worked through the intensive 4-day performance schedule, injury rates increased each day (Figure 4). For safety and performance reasons, the increased injury rate was not healthy or acceptable. Considering the comprehensive model of injury causation (Figure 3; Bahr and Krosshaug, 2005), intrinsic and extrinsic injury risk factors were ethically discussed between the coach and researcher in attempt to identify causative factors. Intrinsic risk factors to injury increased through minimized allowable sleep time, increased intensity and pressure for perfect performances, as well as performing in situations with decreased safety precautions. Although the team performed at various locations and at the national festival, the athletes did not have access to proper warm-up and cool-down times and facilities, lacked hydration stations, and had minimal nutritious food (i.e., only time to eat at fast-food restaurants). While the athlete energy levels appeared to slowly decrease, the researcher, as the team physiotherapist, suggested shorter team performance hours and more allowance for sleep and preparation time. Unfortunately, the suggestions could only be partially followed due to the prior commitments made by the organization on behalf of the team. With the increasing rate of injuries, the number of performers who were able to participate fully decreased, but the injured cheerleaders continued performing to the best of their abilities. The situation had implications for safety as the team attempted to maintain its choreography and skill levels, even with the injured athletes. This increased the strain and workload of the healthy athletes, as those athletes needed to complete their own performance work and the work that was
supposed to be completed by the injured athletes. By acknowledging that members of an acrobatic cheerleading team are akin to members of a sports team, respecting athlete health considerations, and implementing the scientifically based injury prevention programs used with other sports, those precautions may have prevented some of the injuries to the cheerleaders.

Over the four days, extrinsic injury risk factors also increased. The team was often expected to perform acrobatic stunts on concrete or asphalt surfaces, and was once required to perform outside during a snowfall. The conditions made it difficult for the team to stunt safely, as team members had slippery hands and the flyers' shoes were also wet; the snow also affected the vision of the performers. Before the event, the coach and researcher had worked with facility organizers to ensure adequate ceiling height, stage stability, and crowd control, but some of the requested resources were unavailable. From the research findings on injury prevention, extrinsic factors can play key roles in creating increased risk of inciting events (Figure 2; Meeuwisse et al., 2007).

**Athletic Coping Skills**

From a practical perspective, the subsets tested by the ACSI-28 should have been appropriate and relevant to the team and situation in this study, especially if the original methodology was applicable. Ideally, the data would have spanned the entire season, with the initial intent to identify coping skill levels through preseason, after the regular season, and then compare with the 4-day intensive schedule. When the data were analyzed around the 4-day intensive schedule, the internal reliability (determined by Cronbach's alpha) for
the subsets of the ACSI-28 ranged from .33 to .71, with an overall Cronbach $\alpha = .87$. It is possible that missing data between the Time 1 and Time 2 test scores may have led to the lower values for some of the subsets, even though the overall reliability was high and comparable to the study of Meyers et al. (2008).

With regards to the change in scores between the test times, the composite score for coping skills that used all subsets of the ACSI-28 showed little change between the tests (Time 1: $M = 3.5$, $SD = .44$; Time 2: $M = 3.4$, $SD = .45$, $t = 1.8$, $p = .09$). The composite score was expected to decrease more, considering the intensity of the situation. Considering the small sample size, the composite score may not have been sensitive to the time-frame, may not have been a reliable testing measure, or may not have been an appropriate measure for the given situation. It would have been interesting to either use a larger sample size, or more time between testing, to see if the results showed a statistically significant change in coping skills, as originally hypothesized.

Although the composite scores did not show a statistically significant difference, some changes were noted in the subset scores. From the ACSI-28 results shown in Table 1, two coping skill dimensions (coping with adversity and freedom from worry) showed a statistically significant change between the pre- and post-testing periods. Compared to the normative values (coping with adversity, $M = 3.0$; freedom from worry, $M = 3.3$) obtained by Smith et. al (1995), the team recorded scores that were above the normal value for coping with adversity in both the pre- and post-tests. The dimensions that showed a change were logical for the situation. Because of the intense and unpredictable
performance schedule, and fan/bystander interference, it would be expected that the athletes would be more challenged and less able to adapt to the changes or unexpected situations after the performances. After the four days, the mean score for the ACSI-28 for dealing with adversity decreased (Time 1: $M = 3.8$, $SD = .70$; Time 2: $M = 3.6$, $SD = .71$, $t = 2.2$, $p = .05$), reflecting a diminished feeling for coping with adversity. Before the team left for the final football game and when beginning its intensive schedule, it would be plausible for team members to feel apprehensive. When the event was over, and cheerleading season had come to an end, the cheerleaders would be expected to be less worried. In the analysis, the mean scores from the ASCI-28 subset, freedom from worry, significantly decreased between the testing periods (Time 1: $M = 3.2$, $SD = .89$; Time 2: $M = 2.9$, $SD = .73$; $t = 2.6$, $p = .02$). Other changes, while not statistically significant, showed that the scores for the coping skill subsets decreased (i.e., perceived ability to be coached; concentration; and confidence and motivation). During the 4-day intensive performance schedule, the team often needed to adapt quickly, using their own good judgment to make safe, appropriate decisions. Sometimes, the coach was not able to be with the performers, and the performers had to take control of some situations on their own. This could explain the slight decrease in the perceived ability to be coached, though not at a significant level. Concentration is essential for the acrobatic component of cheerleading, and the entire stunt group must work together. At some of the chaotic locations, the concentration levels of the performers would likely be kept high. Often, the audience members, football fans, organizers, and football
players were mixed together at the venues, with activity seeming to take place in all directions. As a party atmosphere was alive at every venue and in the streets, the athletes may have felt that they were keeping up a constant level of concentration in order to simply complete the performances. Often, the audiences seemed to be more familiar with dance-only cheer teams, and were excited and responsive when watching the acrobatic stunting. For audiences that were familiar with acrobatic stunting, they usually watched from the stands at a stadium when the cheer team was on the field. In the performance venues over the four days, audiences were typically standing right beside the cheer team on the dance floors. The audience reaction was very positive, with many of the audience members chanting for a longer performance. This also seemed to boost the athletes’ confidence and motivation. Crowd reactions to a cheerleader falling or being injured are never good. From the cheerleader’s perspective, a mistake is a source of embarrassment, and an injured team member can be unnerving and jeopardize the safety of the rest of the team for the remainder of the performance.

In further analyses, statistically significant changes may have been found in tests conducted earlier in the season, when the team was less cohesive and the skills/choreography were less practiced. Providing coaches, managers, and team organizers with specific psychological assessments with reference to the changes over time would be beneficial in terms of injury prevention, and for scheduling cheerleader events for the Grey Cup Festival.
Initially, the athletes were not expected to have higher goal-setting and mental preparedness scores after the four days, or feel better able to peak under pressure. From a theoretical perspective, these would seem logical, considering the high levels of psychological and physiological stress placed on the cheerleading team during the performance schedule. Interestingly, considering the safety requirements, the cheerleading team was able to thrive in some of the coping skill dimensions after four days of intensive pressure. During the regular season, the team had been coached to deal with adverse situations and high levels of stress, with the expectation of fans to perform perfectly. Part of being a cheerleader requires being able to live up to societal stereotypes of near-perfection. During the Grey Cup performances, the team had opportunities to demonstrate their elite skills in front of audiences that received their performances well. While the ACSI-28 measure does not show change (as supported by the low alpha values, and low test-retest reliability), the researcher noted the importance of coping with adversity (fan interference), coachability (last minute-schedule changes), concentration (high level of possible distraction during performances), confidence and motivation (fan support and large crowd sizes), peaking under pressure (performing at the Cheer Extravaganza and being compared to all other teams), goal setting and mental preparation (articulation of the skills), and freedom from worry (surrendering control of the situation to allow the performance to occur).
Athlete Burnout

With regards to internal consistency, the Cronbach alpha of the data from the entire scale was high (0.89), and for the subsets it ranged from \( \alpha = 0.70 \) to 0.87, which indicates average to good reliability. The athletes in the study by Raedeke and Smith (2001), if used for normative data, had mean scores of: devaluation \( (M = 2.19, SD = 0.95) \), emotional/physical exhaustion \( (M = 3.06, SD = 0.82) \) and reduced sense of accomplishment \( (M = 2.30, SD = 0.79) \). In comparison, the cheer team results were slightly higher than the results obtained by Raedeke and Smith for all three subsets, prior to Time 1, and even more at Time 2. This may indicate that the athletes were already experiencing some symptoms of burnout before the 4-day schedule began.

Although athlete burnout scores were hypothesized to increase after the 4-day intensive performance schedule, this was not the case. This is another example of the appropriateness of the testing measure to the original study design throughout the entire season, as opposed to the shortened time frame. With regards to the ABQ, no statistically significant change was noted between the pre- and post-tests. An interesting consideration may be that the athletes’ may not have perceived the 4-day event as stressful, but instead as exciting. The energy and excitement may have overshadowed the negative stress, which may be indicative of the trend towards increased exhaustion, but not devaluation of the sport or reduced sense of accomplishment. It would be interesting to replicate the testing before and after a 4-day intensive training camp, where the athletes would be learning skills and not performing to positive audience
feedback, and compare the change in burnout test measure scores to those collected after the four days of excitement and crowd-pleasing performances. The other major factor to consider would be the level of burnout of the athletes prior to Time 1, which was at the end of the football season. As the athletes entered the 4-day schedule, with above average scores in the burnout scales, no significant change was seen in the short time-frame. Another significant factor may have been the athletes who were the most tired and exhausted choosing not to fill out the questionnaires on the way home (less than half the team filled out the second round of questionnaires). To avoid influencing the results, the researcher did not pass out the questionnaires to the participants on the bus (the team manager’s task). Nevertheless, the manager noted that many of the athletes slept during the trip, and thus, refrained from waking them to give them the questionnaires. Although the $p$ value was not significant, a trend from the results seemed to be present in 16 participants, for the emotional and physical exhaustion scores ($\text{Time 1: } M = 2.4, SD = .82; \text{Time 2: } M = 2.7, SD = .64; t = -1.6; p = .13$). This suggests that those who completed the questionnaire during the bus ride perceived an increased level of exhaustion after the event, keeping in mind that those were the athletes that had enough energy to stay awake for the long bus ride.

Interestingly, the ABQ scores were consistent with the athletes’ perceived value of their sport ($\text{Time 1: } M = 2.1, SD = .72; \text{Time 2: } M = 2.1, SD = .59; t = -1.3; p = .23$), and also demonstrated an increase in their sense of what they had accomplished ($\text{Time 1: } M = 2.0, SD = .53; \text{Time 2: } M = 1.9, SD = .40; t = .74; p =$
The crowd support for the cheerleading team with its acrobatic components was high. Often, bystanders could be heard commenting about the team’s skills, and many bystanders followed the team into the venue to watch the performance. Audience members gasped and cheered whenever a flyer performed a technically difficult aerial stunt, and they clapped to see a second performance. The feedback from the crowd and organizers was almost always positive (except when a fall or performance error occurred), and the team was often asked to perform again, even though a dancing team was scheduled to perform. In general, these observations were highly supportive of the activity/sport of cheerleading. The positive feedback after the performances may have mitigated any devaluation of sport, and actually improved the athletes’ perception of their cheerleading.

Although no statistically significant changes were found in any of the three burnout subsets, considering the small sample size, future research could explore this dimension of the ABQ for helping coaches and managers indentify the psychological markers that would indicate that training should be stopped. The scores for emotional/physical exhaustion may have been higher if more athletes had filled out the questionnaire. The difference between the two test scores reflected the schedule and the performance expectations for the team. Future research could follow more participants over different time frames to determine a useful testing protocol.
Performance Errors and Injury Differences Between Games

The increase in performance errors and injuries comparing a game in the home stadium, to a game in a different stadium after intensive performing was as anticipated. The slight decrease in performance errors on Day 3 was likely a result of the majority of the afternoon being spent walking through a rehearsal for the Championship game, with no acrobatic skills required. It was not expected for cheerleaders of this caliber to have such a high number of injuries and errors during a game and throughout repeat performances of the same stunting and choreography during performances. It was hypothesized that the increased errors and decreased performance were due to psychological burnout and decreased coping skills, but statistically this was not the case. With the increase of intrinsic and extrinsic risk factors, the athletes became predisposed to injury. When the inciting events did occur, there was less opportunity to prevent the injury, and performance decreased correspondingly. Statistically, the psychological factors tested for (coping and burnout) did not show an increase numerically with regards to determination of a preventative measure to identify an increase in internal risk factors that could be used by coaches. Practically, the trends in this small sample data collection warrant further study and examination.

When comparing cheerleading to a sport, especially in terms of the rate of injuries when pre- and post-performance health accommodations are lacking, acrobatic stunt cheerleading appears to require more training as seen in sports like gymnastics, and unlike aesthetic activities (i.e., dance). Information provided
to athletes, with regards to safety, nutrition, and physiological and psychological preparation would likely also benefit cheerleaders. Coach education becomes paramount with respect to injury prevention. When documenting the 4-day schedule, stronger consideration of intrinsic and extrinsic risk factors may have played a key role in decreasing the number of injuries sustained over the 4-days, and thus, providing the opportunity for improved performance.

**Relationship Between Psychological Variables and Performance**

When exploring the second objective, the relationship between coping skills, burnout, injury, and performance errors, some of the subsets were found to be highly correlated (Table 2). The correlation between burnout and coping scales was significant, but to the 0.05 level of significance. This was expected since amotivation and coping were variables used for validating the ABQ (Raedeke & Smith, 2001). The correlation between the pre- and post-ASCI-28 was not significant, which could be explained by some dimensional subsets decreasing in scores, while other subsets increased. Again, this leads to a question about the reliability of the composite score in the ACSI-28, considering the small sample size and the short time-frame between testing.

**Measurement Implications**

As the pre- and post- ABQ correlated, but the ACSI-28 did not, ultimately, the two measures may not have been the best choice considering sample size and the short-time frame. Although no statistically significant correlation was found between the psychometric measures and the number of total errors or injuries, the error rate and injury rate increased over the four days, with an
increasing trend in the burnout dimension and a decreasing trend in coping skills. Because of the small sample size ($N=16$), the probability of predicting relationships between the psychometric measures for injury and error was low. Intuitively, performance errors and injuries would be expected to increase as coping and energy levels decrease.

Perhaps, with respect to cheerleading, the psychometric measures may need to be scored differently. Hypothetically, when a stunt falls (or fails), the flyer will likely be injured, being the person in the highest risk position. The flyer would probably be the person to sustain injury as she would be the person that was not caught properly in the group when the stunt fell. The flyer may have been performing the best, when compared to the other members of the group, but may have been injured because one of the people catching her was not performing well. Therefore, with respect to cheerleading, the intra-group dynamics play an important role in injury prevention. A poor correlation between the injured person and his or her psychological factors leading to the injury may exist because the person that makes the mistake may or may not be the one that suffers the consequences. Another example of a typical injury would be when a base is injured while catching a flyer. If the flyer was not paying attention, did not hold her body in the correct position, was unable to initiate the proper body rotation, etc., she will be very difficult to catch. In this example, the flyer would be the one that would initiate and/or cause the performance error and/or injury, but the base would be the one to get injured, as the base was responsible for the catch and had to take the brunt of the force and attempt to
minimize the flyer’s mistake. When compared to a sport such as gymnastics, if the gymnast is not performing well, or does not execute the skill properly, the gymnast is the one to suffer the consequence and possible injury, as the gymnast is solely responsible for his or her movement. For cheerleading, due to the complexity of the group work and the gymnastic movements being performed off of or onto another person, it becomes more difficult to determine which person was the cause of the error or injury.

Limitations

With respect to the validity of the research design, the internal and external threats were addressed and minimized within the limitations of field research and the CFL organizational requirements. Mortality was the largest threat to internal validity, as only 16 of the 38 athletes completed the Time 1 and Time 2 questionnaires. Instrumentation was also a small threat to the internal validity. Although performances were video-recorded to permit a review of any errors and falls, the video quality was insufficient for seeing all of the athletes and the choreography. Consequently, performance errors and injuries were then documented by the researcher, with a review by the coach and team manager. A threat to external validity was in the team selection, which was based on location. This is a minimal threat; however, as the team is representative of a typical acrobatic stunt team, in terms of the male:female ratio and the position of female team members. The largest threat to validity was the modification of the study method due to circumstance.
Practical Implications

The intention of the study was to examine the psychological variables of coping and burnout before and after an intensive training schedule, and their relationship to rate of injury. From a practical viewpoint, the study was to provide some insight into injury prevention strategies and techniques that would be useful in cheerleading. Although the psychometric variables from the ABQ and the ACSI-28 were expected to demonstrate a change after four days of intensive performing, this was not the case. In cheerleading, intensive training camps are typically held for three to four days. To prevent injuries and decrease the risk to athletes, objective tests would be helpful for coaches who would be able to identify injury risks, and stop training sessions as necessary. Although the ABQ demonstrated trends in exhaustion and fatigue, it was not sensitive enough to be a reliable marker for coaches, in a training session of four days with a small sample size. The ACSI-28 could be a useful tool for coaches to obtain subset scores pertaining to the safety of a cheerleading team, though a longer time frame between testing would be recommended. Future studies applying alternate psychometric measures may be more sensitive in reflecting athlete changes over short periods of time.

The daily increase in injuries during the intensive performance schedule, and the performance error rate and injury rate during the primary game can provide important information for cheerleading coaches, with regards to scheduling practices and training sessions for athlete adaptability and safety. With many performances, athletes' general health accommodations need to be
considered and scheduled. Adequate breaks for meals, sleep, proper nutrition, warm-up and cool-down times, and facilities are important for the overall health and wellness of athletes. This information may be more common knowledge for coaches in mainstream sport as a result of coaching education and workshops. The exploratory nature of the study highlights areas of concern as cheerleading transitions from being a dance activity to a sport. Coaches should be aware of current sport-science injury prevention and performance that can be adapted to cheerleading, and implement the science into the art of the performance.

**Future Considerations**

Ultimately, more research is needed to explore the long-term goal of preventing injuries in cheerleading. Studies that identify predisposing internal risk factors that use psychometric testing, and that explore external risk factors with coaching strategies and safety considerations are needed for the different levels of cheerleading. More sensitive psychometric measures for short time frames would also be beneficial, or development of alternate scoring procedures that take into perspective the intra-group complexities of the stunting. Although the ABQ and the ACSI-28 subsets are useful for studying cheerleading as a whole, psychometric measures that cover longer time frames would be especially important for injury prevention. Having the opportunity to observe the cheerleaders over the weekend, psychometric measures that address anxiety, fatigue, and vigor may have been more appropriate for the shortened time frame. The importance of the ability to monitor the physiologic component of the athletes can not be overstated and a suitable measurement tool would be
welcomed. Over time, as coaching methodology and education improves, monitoring nutrition, sleep, and hydration, as initially intended, will be paramount. As cheerleading transitions to a sport, the safety concerns will be increasingly important. Studies that use larger sample sizes and additional physiological variable measurement would be particularly beneficial.
REFERENCES

College Safety Rules. Retrieved from:


APPENDIX A. ETHICS APPROVAL

UNIVERSITY OF REGINA
RESEARCH ETHICS BOARD
Application for Approval of Research Procedures
(last updated April 2007)

Section I: Identification and Purposes
1. Date: March 3, 2009
   Name of Applicant(s): Daysha Shuya
   Department or Faculty: Kinesiology and Health Studies
   Co-Applicants:
   Student # (if applicable): 200246493
   Mailing Address (if different than Department):
   Telephone #: 501.2468
   E-mail: Daysha.shuya@uregina.ca
   Title of Research: Factors influencing cheer team performance and health

2. Students please provide:
   Student level ☑ Graduate ☐ Undergraduate
   Name of supervisor: Dr. Kim Dorsch Department: Kinesiology and Health Studies

3. Signatures and Acknowledgement:
   Your signature(s) below acknowledges that:
   - The information in this application is correct to the best of your knowledge
   - You will notify the REB of any changes or amendments to this application
   - Contact with human subjects in the proposed research will not commence until ethical approval is obtained
   - All members of the research team are aware of, and adhere to, University of Regina regulations and policies for conducting research, including the Tri-Council Policy Statement (TCPS).

Signature of Applicant(s) ________________________________
Signature of Advisor or Instructor __________________________

Date ________________________________

Reminder: Please attach a copy of your recruitment letter or poster, consent form, questionnaire, interview questions, etc.

4. Provide an overview of the main features and variables of the research problem. Include a brief review of the relevant literature, a statement that describes the significance and potential benefits of the study, your hypotheses (if applicable), a brief description of your measures and some information about your design and analytic approach (e.g., "narrative data will be analyzed through grounded theory methodology"; "a 2 x 2 Multivariate Analysis of Variance will be employed for the data analysis").
The popularity of acrobatic cheerleading teams has increased dramatically over the past several years in both the province of Saskatchewan and in the country of Canada. Cheerleading has been identified to have a very high level of catastrophic injury compared to other sports. In 2005, The National Center for Catastrophic Sports Injury Research’s Twenty-third annual report ranked cheerleading the fifth highest number of fatalities, catastrophic and serious injuries in America- not taking into account athlete numbers, number of exposures, or smaller injuries that may not have required emergency room visits. Unfortunately, very little research has been done in attempt to identify the common injuries and injury risk factors in attempt to prevent injury from occurring. The goal of this study is to attempt to collect baseline data on general health, psychological factors, and injury rates of one cheerleading team over the entire length of their season based on work done in other sports (Meeuwisse et al. 2007, Krosshaug et al. 2005, Bahr and Krosshaug 2005). Once the baseline factors have been identified, further research may be planned to improve safety in the sport and prevent injury through prehabilitation and education of the athletes and the coaches.

A pre-season health screen consisting of standard vital signs (height, weight, blood pressure, and pulse) will be performed, with an athlete self-report sport medical history collected. The Athletic Coping Skills Inventory-28 (Smith, Smoll, and Ptacek, 1995) and the Athlete Burnout Questionnaire (Raedeke and Smith, 2001) will be distributed at the beginning of the season, twice throughout the season, and at the end of the season to identify changes in psychological states and general health. Researcher observation will be key throughout the season to determine areas that may require increased study in the future, to this end, the researcher will keep a journal of experiences. Formal data collection will include documentation of he injuries sustained from training and performing, along with the amount of practice and performing time that is modified and/or missed due to injury. The injury records will be treated under the professional code of ethics of the healthcare practitioners involved with the team.

Data analysis will attempt to compare athletes that stayed healthy throughout the season with their levels of burnout and coping abilities. End of season information dissemination will provide the team with the injury rates, potential rates for different stunting positions, and training versus performance situations.

5. Researcher Qualifications: Describe any special training or qualifications you and/or the research team have - only in cases where the research involves special or vulnerable populations (e.g., children, incarcerated individuals, etc), distinct cultural groups, or the research is above minimal risk, otherwise this section may be omitted.

There will be no special or vulnerable populations distinct cultural groups, and the research is above minimal risk.

Section II: Application Checklist

1. Do you consider that this project involves:

☐ HIGH RISK to subjects  
☐ MORE THAN MINIMUM RISK to subjects  
☒ MINIMUM RISK to subjects  

Researchers are advised that “Risk” is defined broadly to include not only threats to one’s physical integrity or health but also temporary as well as permanent psychosocial consequences (e.g., experiencing negative mood for a brief period as a result of research participation, potential for violations of privacy, potential for upsetting a third party because of research participation).

If other than MINIMUM RISK, please explain and submit the full research proposal (e.g., grant application, thesis proposal) or, if a full proposal is not available, contact the REB Chair.

The REB reserves the right to request a copy of the full research proposal for any project that is assessed (by any one of the reviewers of the application) as involving more than minimum risk.
2a. Do you think that the research findings from this project might result in a financial benefit to the researchers?  
☐ Yes  
☒ No  

If Yes, please explain.

2b. Do you think that the research findings from this project might be commercially valuable to others (e.g. the researchers’ employers, the project sponsors)?  
☐ Yes  
☒ No  

If Yes, please explain.

3. Would this research project or its findings place you or any member(s) of your research team in potential conflict of interest situation (e.g., being both a researcher and an employee of the organization being studied)?  
☐ Yes  
☒ No (explanation below)

Although the researcher is acting in both a research and employee capacity, the research aspect does not change what the regular professional duties and obligations will be to the organization. The research aspect is observation and collection of injury diagnosis and performance capacity. With regards to accuracy of injury data diagnosis and collection, when acting in the role of physical therapist, for the safety of the team and to maintain license and professional designation, all information must be recorded consistent to the standards established through the professional governing body.

4. How long do you expect your research project (contact with human subjects for data collection) to last?  
☐ Less than one year from the date of approval  
☒ More than one year from the date of approval (an annual renewal will be needed every year)

5. What are the sources of funding (if any) for the proposed research?  
none

6. Does your research project require approvals from other organizations such as school boards, aboriginal communities, local governments, etc? Please describe. What steps will you take (or have taken) to obtain these approvals?  

No formal approval is required, but all aspects of the proposed research was discussed either in written or verbal format with the organization, head coach and team manager. All are aware of the research objectives and support the proposal.

Section III: Subjects

1. Briefly describe the number and characteristics of participants required for the study, and how a potential sample of such participants will be identified.

The participants will be members of the 2009 Saskatchewan Roughrider Cheer team- anticipated team size of 37 members.

2. Describe the recruitment procedures. Who will approach potential participants (researcher, assistant or third party) and how (e.g. by phone, mail)?
Members of the team have been selected through an organized try-out procedure by the head coach. A presentation of the proposed research will be provided at the first day of the team skill-building camp by the researcher.

3. What will the participants be required to do in the course of the project?

The participants will be required to undergo baseline health testing including height, weight, blood pressure and pulse rate when they join the team. They then will provide their general health history according to the form attached. The health history form is a slight modification of the Canadian Inter-university Sport (CIS) athlete’s health history form provided to all university athletes that compete in the CIS. Essentially, the participants will undergo a standard pre-season contact sport health screen.

Four times throughout the season, they will be asked to fill out psychological measures (Athletic Sport Coping Skills-28 and the Athlete Burnout Questionnaire) and have their baseline health testing re-assessed at those times. The time commitment will be approximately 10-15 minutes at each of four sessions per season. All injuries sustained during training, fitness conditioning, and/or performing will be documented throughout the season. The documentation will include the mechanism of injury, time modified or missed from performance and the official diagnoses provided by a licensed health care provider after formal assessment. This information will be kept in a separate research data file and not included in their physical therapy treatment records. The athletes are provided the opportunity to receive treatment through team doctors and physical therapist, but are free to receive care from any healthcare practitioner they choose.

4. What information about the research project and their role will participants be given during the initial contact?

They will receive a full verbal explanation of the proposed study upon first skill camp, with an opportunity for group and private questions afterwards.

5. Will a consent form be used? If so, when will it be presented (e.g. immediately before interviews take place)?

Yes, a consent form will be used and presented during a research presentation of the first skill camp. Please see the attached consent form.

6. a) Will participants be anonymous in the data gathering phase of the study? (Anonymous means that no can be established between the participant and the research – no one including the researcher knows who has participated in the research)

☐ No  ☐ Yes, the researcher only  ☐ Yes, no one including the researcher knows

As the entire team may not consent to be a part of the study, those not involved in the study may be aware of the happenings of the participants due to the group nature of the sport.

b) Will the confidentiality of participants and their data be protected? (Confidentiality means that no link can be established between the collected information and the participant’s identity)

☐ No  ☐ Yes

☐ Yes, with the following limits:

☐ Limits due to the nature of group activities (e.g. focus groups): the researcher can not guarantee confidentiality

☐ Limits due to context: individual participants could be identified because of the nature or size of the sample or because of their relationship with the researcher.

☐ Limits due to selection: procedures for recruiting or selecting participants may compromise the confidentiality of participants (e.g. participants are referred to the study by a person outside the research team)

☐ Other:

c) What assurances will participants be given and what precautions will be taken regarding the confidentiality of the data or information which they provide in the study?
All health care treatments will be provided at clinics of the participants’ choosing. The head coach, team manager, and physical therapist/researcher will be aware of the current health status of all participants for team planning and training purposes. Health care providers will be working under their professional obligations and scopes of practice. The participants will be advised that the coaching staff (head coach, team manager, team trainer, and team doctor) will be aware of their current health status for their safety and the safety of their teammates. This process normally occurs whether or not the team is part of a research project. Participants will be asked to provide their names simply to match psychological measures to injury records only. Once the data have been obtained, it will be coded numerically between the psychological inventories and the injury data. Because of the researchers role on the team, only the researcher will then know the connection between the participant and the data.

7. Will children be used as a source of data?
   - Yes
   - No

   If Yes, indicate how consent will be obtained on their behalf.

8. Will the researcher or any member of the research team be in a position of power or authority in relation to the subjects? (For example: A teacher doing research and having a class as subjects or a counselor collecting research data from clients).
   - Yes
   - No - please see clarification below

   If Yes, indicate how coercion of subjects will be avoided.

   Although the researcher is the team trainer/physical therapist, the research purposes of the study are only the injury data and baseline burnout/athletic coping psychological measure collection. Therefore, with respect to the research study, there does not appear to any direct coercion. If the subjects are injured, they will contact the researcher or any health care provider for an injury assessment and/or treatment session. The researcher will not approach the subjects for treatment unless the subject is severely injured and requires immediate assistance. As the participant must actively seek treatment, he or she is doing so out of choice. Participants are free to attend treatment at any healthcare provider, for the research component, the researcher will only be verifying and tabulating diagnosis and time missed/modified from performance.

9. Describe any apparatus, substance, element of the physical environment or other materials that could cause harm to a participant if a side effect, malfunction, misuse accident or allergic reaction were to occur. If the participant comes into contact with a potentially hazardous apparatus or material, who is responsible for checking defects or malfunctions, and on what schedule will inspections be made? If participants come into contact with some substance that could cause harm, please document your safeguards.

   There is no potential source of risk for the participant in conjunction with this research study.

10. Will deception of any kind be necessary in the project?
    - Yes
    - No

    If yes, explain why.

11. Describe any debriefing procedures that will be used. (Note that if deception is used, debriefing is necessary).

    Injury statistic data will be supplied to the team at the end of the season. If a health concern is identified during the data collection, the participant will be referred to the appropriate health care provider.

12. Will participants be compensated?
☐ Yes
☒ No

If yes, explain how and when they will be compensated and why you think that amount and form of compensation is appropriate.

Section IV: Access to Data and Findings

1. Who will have access to the original data? (For example co-investigators, students) How will all those who have access to the data be made aware of their responsibilities concerning privacy and confidentiality?

Only the researcher/physical therapist and her university supervisor will have access to the original data.

2. How do you anticipate disseminating your research results?

a) Directly to participants, describe how (e.g. website location of findings, location of published study, etc)

Information will be provided verbally at a final team meeting post-season, they will also be provided with the location of the potentially published study.

b) Check all others that apply:

☒ Thesis/Dissertation/class presentation ☐ Media (e.g. newspaper, radio, TV)
☒ Presentations at scholarly meetings ☒ Published article, chapter or book
☐ Internet ☐ Other, explain:

3. Describe your plans for protecting data as well as preserving or destroying data after the research is completed. For all data (e.g. paper records, audio or visual recordings, electronic recordings), indicate the:

a) means and location of storage (e.g. a locked filing cabinet, password protected computer files)

b) time duration of storage. (REB requires that data be archived for a minimum of three (3) years)

c) final disposition (archive, shredding, electronic file deletion)

(See Section IV-3 of the Guidelines)

a) the data will be locked in a filing cabinet in the Motivation for Active Living lab at the University of Regina, electronic data will be stored in password protected computer files in the Motivation for Active Living lab at the University of Regina

b) data will be kept for 7 years

c) the paper charts will be shred, and the computer files will be deleted after 7 years
DATE: April 2, 2009

TO: Daysha Shuya
    Kinesiology and Health Studies

FROM: Dr. Bruce Plouffe
      Chair, Research Ethics Board

Re: Factors Influencing Cheer Team Performance and Health (66S0809)

Please be advised that the University of Regina Research Ethics Board has reviewed your proposal and found it to be:

☑ 1. APPROVED AS SUBMITTED. Only applicants with this designation have ethical approval to proceed with their research as described in their applications. For research lasting more than one year (Section 1F). ETHICAL APPROVAL MUST BE RENEWED BY SUBMITTING A BRIEF STATUS REPORT EVERY TWELVE MONTHS. Approval will be revoked unless a satisfactory status report is received. Any substantive changes in methodology or instrumentation must also be approved prior to their implementation.

☐ 2. ACCEPTABLE SUBJECT TO MINOR CHANGES AND PRECAUTIONS (SEE ATTACHED). Changes must be submitted to the REB and approved prior to beginning research. Please submit a supplementary memo addressing the concerns to the Chair of the REB. **Do not submit a new application.** Once changes are deemed acceptable, ethical approval will be granted.

☐ 3. ACCEPTABLE SUBJECT TO CHANGES AND PRECAUTIONS (SEE ATTACHED). Changes must be submitted to the REB and approved prior to beginning research. Please submit a supplementary memo addressing the concerns to the Chair of the REB. **Do not submit a new application.** Once changes are deemed acceptable, ethical approval will be granted.

☐ 4. UNACCEPTABLE AS SUBMITTED. The proposal requires substantial additions or redesign. Please contact the Chair of the REB for advice on how the project proposal might be revised.

Dr. Bruce Plouffe

Cc: Dr. Kim Dorsch - Kinesiology and Health Studies

**supplementary memo should be forwarded to the Chair of the Research Ethics Board at the Office of Research Services (Research and Innovation Centre, Room 109) or by e-mail to research.ethics@uregina.ca**
APPENDIX B. INFORMED CONSENT FORMS

Informed Consent Form

Factors Influencing Cheer team Performance

Thank you for agreeing to participate in the cheer-associated health project. Before the study can get underway, we require that consent to participate be on file here at the University of Regina. As indicated, we are inviting you to be involved in the study. You were chosen to be a part of the study based on your acceptance to the 2009 Saskatchewan Roughrider Cheer team. The decision about whether to participate is yours alone. Although you are not obliged to participate in any way, your cooperation (and participation) is very important to the success of this project particularly given the lack of published information and the full season nature of the project. However, your decision whether or not to participate will not affect your future relations and/or involvement with your team, the Saskatchewan Cheerleading Association, or the University of Regina.

Participation in the research would require that you complete four questionnaires periodically throughout the 2009 cheer team season. These questionnaires will generally take between 15-20 minutes to complete. It is also asked that you consent to data collection on any injuries you may sustain throughout the season or any illness that may cause you to alter your participation. Confidentiality of your responses and the information provided is assured. All data will be analyzed and reported on aggregate basis, not on an individual basis. There are no physical or psychological risks associated with participating in this research. You may withdraw from this study at any time without penalty.

If you have any questions or concerns that have not been answered by the accompanying information, you can contact Daysha Shuya (306.501.2468) or Kim Dorsch (306.585.4742). The University of Regina Research Ethics Board approved this project. If you have any questions or concerns about your rights or treatment as a research participant, you may contact the Chair of the Research Ethics Committee, at (306) 585-4775 or e-mail: research.ethics@uregina.ca.

Thank you for participating in this very important research.

Based on the information I have received about this study, I agree to participate. I have kept a copy of this consent form for my records.

Name of Athlete ______________________________ Signature of Athlete ______________________________ Date ______________________________
Factors Influencing Cheer team Performance

Attention Cheer team members:

This study is trying to better understand health issues associated with cheerleading. To that end, you are invited to participate. We have been in contact with your coach and the Saskatchewan Roughrider Football Organization and they fully support this project.

This project will continue throughout the 2009 football season. By listening to what you have to tell us, our ultimate goal is to work with our organization to develop workshops and/or programs that will assist you in enhancing your participation and enjoyment of the sport. In this phase, we need you to answer the questions contained in this survey. Your cooperation is critical to the overall success of this project.

The following pages contain questions about your basic responses to cheer team situations. The questionnaire should take about 10-15 minutes to complete. Your answers will remain anonymous and confidentiality is assured. All data will be analyzed and reported on an aggregate basis, not on an individual basis.

As we noted previously, you are under no obligation to participate. However, the quality of the study depends on (a) a high participation rate from the entire group, and (b) completing the entire questionnaire to the best of your ability. Furthermore, your decision whether or not to participate will not affect your future relations with your team, the Saskatchewan Cheer Association, or the University of Regina.

Completing the questionnaire will be taken as further evidence of your willingness to participate and consent to have the information used for the purposes of this study. There are no right or wrong answers. It is your personal perceptions that count.

Some other points to remember:
  • Respond to each and every question
  • Be honest and spontaneous.
  • Do not spend too much time on any one question – your first response is always best

This project was approved by the University of Regina Research Ethics Board. If you have any questions or concerns about your rights or treatment as a research participant, you may contact the Chair of the Research Ethics Committee at 585-4775 or email: research.ethics@uregina.ca.

Thank you for taking the time to participate in this important study.

Daysha Shuya  
Faculty of Kinesiology and Health Studies  
University of Regina  
306-501-2468  
Daysha.shuya@uregina.ca

Kim D. Dorsch, Ph.D.  
Faculty of Kinesiology and Health Studies  
University of Regina  
306-585-4742  
Kim.Dorsch@uregina.ca
APPENDIX C. HEALTH CARE SCREENING FORMS

Pre-season health Screen

*To be completed by the athlete, please print in a legible manner

Date: ________________

Personal Information

Name: ____________________________ Position: ____________________________

Address: __________________________ City: __________________________ Province: __ Postal Code: ______

Home Phone Number: (___) _______ Date of Birth: ______________ DD/MM/YYYY

Health Card Number: __________________________ Province: ______________

Emergency Contact Information

Name: ____________________________ Relationship: ____________________________

Address: __________________________

Main Phone Number: ______________ Alternate Phone Number: ______________

Health Information

Family Physician’s Name: ______________ Date of last Physical ______________

Please answer YES or NO to the following:

1. Have you ever been hospitalized? YES NO
2. Have you ever had surgery? YES NO
3. Have you ever had an injury requiring surgery, physiotherapy or other treatment? YES NO
4. Have you had an illness or medical condition lasting longer than one week? YES NO
5. Do you have a heart condition? YES NO
6. Do you have high blood pressure? YES NO
7. Have you developed chest pain at rest within the last month? YES NO
8. Do you experience chest pain or severe shortness of breath on physical exertion? YES NO
9. Do you have trouble breathing or do you cough during or after activity? YES NO
10. Do you have asthma? YES NO
11. Do you experience fainting or dizzy spells with physical exertion? YES NO
12. Have you ever experienced an irregular heart- beat (racing, skipping beats)? YES NO
13. Has anyone in your family died of heart problems or sudden death before age50? YES NO
14. Are you allergic to anything (medications, bee/insect stings)? YES NO
15. Are you presently taking any prescribed or over the counter medications? YES NO
16. Are you presently taking any vitamins or supplements? YES NO
17. Have you ever suffered from heat cramps, heat exhaustion, or heat stroke? YES NO
18. Do you have any skin problems (itching, rashes, acne)? YES NO
19. Do you experience frequent or severe headaches? YES NO
20. Have you ever had a seizure? YES NO
21. Do you have epilepsy? YES NO
22. Have you ever had a concussion or a head injury? YES NO
23. Have you ever experienced a burn/transfer or neck injury? YES NO
24. Are you diabetic- hyper [ ] or hypo [ ] glycemic (please check one)? YES NO
25. Have you experienced any unexplained weight change? YES NO
26. Do you have vision problems? YES NO
27. Do you wear contact lenses and or glasses? YES NO
28. Do you use any special equipment (pads, braces, orthotics, dental, eye etc.)? YES NO
29. Do you have bone or joint problems not related to injury? YES NO
30. Do you experience abdominal pain? YES NO
31. Do you currently have an incompletely healed injury? YES NO
32. Have you had any other medical problems/injuries not identified by the above questions? YES NO
33. Do you have anything you wish to discuss with the team physician or medical staff? YES NO
34. Last Tetanus Shot: _______ (month/year)
35. Last Measles Immunization: _______ (month/year)
36. Female: Are your menstrual cycles normal YES NO

EXPLAIN “YES” ANSWERS from the questions above

- Any medications/supplements

- Health conditions

- Allergies

- Number of previous concussions, were you ever unconscious Y/N, date of last concussion, time to removed from activity, memory, dizziness or recurrent headaches or symptoms

- Number of neck injuries, number of burners, date of last incident, length of sensation or strength change

- In the past, please check if you have injured your:

  Are any of these injuries not fully healed? YES NO
  Please describe the YES injuries:

  __________________________________________________________
  __________________________________________________________
  __________________________________________________________

  ANY YES ANSWERS MAY REQUIRE FURTHER EVALUATION BY THE TEAM MEDICAL STAFF

Consent (please initial):

___ I agree to undertake this procedure in order to enable medical staff to ensure I am fit to train and compete
___ I am aware that some information may require clarification of follow up with my treating doctor, coach and/or physical therapist, and agree to the release of relevant information to these people
___ I am aware that medical fitness issues may be discussed with the head coach
___ I understand that the information contained in this form is otherwise confidential and can only be released with my consent
___ I agree to participate in medical research that the team is involved with
___ I consent to treatment by the team doctor and therapists as required and as they see fit
___ I am aware that participating in cheerleading with the Saskatchewan Roughrider Cheer team may result in serious physical injury and in the aggregation, deterioration, and re-injury of any pre-existing medical condition(s) during and after my playing tenure with the cheer team. I fully understand and assume the consequences of participating with the medical condition(s) set forth in this document. This information is accurate, to my best knowledge, and I hold no member of the Saskatchewan Roughrider Cheer team responsible for any injury incurred.

I hereby certify that the above information is correct:

Athlete’s Signature: ___________________________ Date: ______________ DD/MM/YYYY

PHYSICAL EXAMINATION FORM *to be completed by the health team as required

Athlete’s Name: ___________________________ BMI: _______

Height: _______ Weight: _______ BP: _____ / _____ Resting Pulse: _______
APPENDIX D. PSYCHOMETRIC TESTING FORMS

The Factors Affecting Cheerleading Performance and Health Study
Athlete Burnout Questionnaire

This study is looking at various factors that may affect cheerleading performance on the field and during practice- please help us out by answering the following questions. Pick the first answer that comes to your mind, and please answer ALL of the questions. Thanks!

Directions: A number of statements that athletes have used to describe their feelings about sport are given below. By circling a number on the scale below following each item, please indicate the degree to which you are experiencing each feeling now, at this point in time.

1 2 3 4 5
almost never rarely sometimes frequently almost always

I’m accomplishing many worthwhile things in cheerleading 1 2 3 4 5
I feel so tired from my training that I have trouble finding energy to do other things 1 2 3 4 5
The effort I spend in cheerleading would be better spent doing other things 1 2 3 4 5
I feel overly tired from my cheerleading participation 1 2 3 4 5
I am not achieving much in cheerleading 1 2 3 4 5
I don’t care as much about my cheerleading performance as I used to 1 2 3 4 5
I am not performing up to my ability in cheerleading 1 2 3 4 5
I feel “wiped out” from cheerleading 1 2 3 4 5
I’m not into cheerleading like I used to be 1 2 3 4 5
I feel physically worn out from cheerleading 1 2 3 4 5
I feel less concerned about being successful in cheerleading than I used to 1 2 3 4 5
I am exhausted by the mental and physical demands of cheerleading 1 2 3 4 5
It seems that no matter what I do, I don’t perform as well as I should 1 2 3 4 5
I feel successful at cheerleading 1 2 3 4 5
I have negative feelings toward cheerleading 1 2 3 4 5
I feel emotionally drained from cheerleading 1 2 3 4 5
I don’t feel confident about my cheerleading abilities 1 2 3 4 5
I feel like I don’t have any energy for cheerleading 1 2 3 4 5
I feel I’ve done very well I cheerleading 1 2 3 4 5
**Athlete Coping Skills Inventory-28**

**Directions:** Read the statements below, and indicate the degree to which you are experiencing each situation now, at this point in time.

<table>
<thead>
<tr>
<th>Rating</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I maintain control no matter how things are going for me</td>
</tr>
<tr>
<td>2</td>
<td>To me, pressure situations are challenges that I welcome</td>
</tr>
<tr>
<td>3</td>
<td>On a daily or weekly basis, I set very specific goals for myself that guide what I do</td>
</tr>
<tr>
<td>4</td>
<td>I handle unexpected situations in my sport very well.</td>
</tr>
<tr>
<td>5</td>
<td>While performing/stunting, I worry about making mistakes or failing to do my job</td>
</tr>
<tr>
<td></td>
<td>I feel confident that I will perform well.</td>
</tr>
<tr>
<td></td>
<td>If a coach criticizes or yells at me, I correct the mistake without getting upset about it</td>
</tr>
<tr>
<td></td>
<td>When things are going badly, I tell myself to keep calm, and this works for me</td>
</tr>
<tr>
<td></td>
<td>The more pressure there is during a routine, the more I enjoy the routine</td>
</tr>
<tr>
<td></td>
<td>I tend to do lots of planning about how to reach my goals</td>
</tr>
<tr>
<td></td>
<td>When I am stunting/performing, I can focus my attention and block out distractions</td>
</tr>
<tr>
<td></td>
<td>I put a lot of pressure on myself by worrying how I will perform</td>
</tr>
<tr>
<td></td>
<td>I get the most out of my talent and skills</td>
</tr>
<tr>
<td></td>
<td>When a coach or manager criticizes me, I become upset rather than helped</td>
</tr>
<tr>
<td></td>
<td>I remain positive and enthusiastic during competition, no matter how badly things are going</td>
</tr>
<tr>
<td></td>
<td>I tend to perform better under pressure because I think more clearly</td>
</tr>
<tr>
<td></td>
<td>I set my own performance goals for each practice</td>
</tr>
<tr>
<td></td>
<td>It is easy for me to keep distracting thoughts from interfering with something I am watching or listening to.</td>
</tr>
<tr>
<td></td>
<td>I think about and imagine what will happen if I fail or mess up</td>
</tr>
<tr>
<td></td>
<td>When I fail to reach my goals, it makes me try even harder</td>
</tr>
<tr>
<td></td>
<td>I improve my skills by listening carefully to advice and instruction from coaches and managers.</td>
</tr>
<tr>
<td></td>
<td>I make fewer mistakes when the pressure is on because I concentrate better</td>
</tr>
<tr>
<td></td>
<td>I have my own game plan worked out in my head long before the practice/performance begins</td>
</tr>
<tr>
<td></td>
<td>It is easy for me to direct my attention and focus on a single object or person.</td>
</tr>
<tr>
<td></td>
<td>I worry quite a bit about what others think about my performance</td>
</tr>
<tr>
<td></td>
<td>I don't have to be pushed to practice or play hard, I always give 100%.</td>
</tr>
<tr>
<td></td>
<td>I maintain emotional control no matter how things are going for me</td>
</tr>
<tr>
<td></td>
<td>When a coach tells me how to correct a mistake I've made, I tend to take it personally and feel upset</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
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<td></td>
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</tbody>
</table>
APPENDIX E. SKILLS AND ACTIVITIES IN SASKATCHEWAN CHEERLEADING

Current cheerleading “encompasses all activities from standing in front of a crowd and shouting cheers to formal competitions involving advanced tumbling and throwing stunts” (Boden, Tacchetti, & Mueller, 2003).

Venues

Cheerleading is seen in Saskatchewan at sporting events, school pep rallies, competition, parades and fundraisers.

During sporting events, the cheerleaders will be involved in sideline dances, vocal cheers with associated dance-type movements, potentially time-out or center field/court presentations and stunting. The cheerleaders are generally located on the sidelines, where the surfaces may have mats, but are likely gymnasium flooring, cement/asphalt, or playing surface. These may be indoor or outdoor depending upon the sporting event. The cheerleaders will likely also be performing for the entire duration of the game, as well as potential pre-game activities. For football, the cheerleaders may be performing for several hours.

School pep rallies may include the same activities as listed for sporting events, but in a less formal setting. There may or may not be a designated cheer area, or time for warm-ups/cool down. The required activity time is generally quite short.

Competitions are becoming very popular with cheer teams in Saskatchewan. Competitions are generally run with a practice time before the competition where the cheerleaders can become oriented to the venue. There is a warm-up area where each team is allocated a certain portion of time to warm-up, review, or practice. The team is then given a short amount of time to practice on the competition floor to become accustomed to the facility, music, lighting and environment. Once the competition begins, the team is called to perform their routine in front of judges and an audience. Likely, they will perform their routine twice, with an indefinite time frame between performances. Rules and regulations are stipulated and adhered to by the governing body associated for the location of the competition. Power Cheer Athletics (PCA) requirements are followed in Canada at the collegiate level. At the provincial level, the Saskatchewan Cheerleading Association (SCA) provides rules and regulations. The National Cheerleading Association (NCA) governs competitions in the United States, or the Universal Cheerleaders Association (UCA) rules elsewhere in the world. The SCA requires a medical first-aid person to be in attendance for all competitions.
Parades and fundraisers are also common places for a cheer teams’ presence to be requested. Activities and skill requirements are generally according to the organizing committees wishes. The environment and performance time frames are highly variable.

Categories of cheer teams in Saskatchewan:

“Pom”- traditional/dance

Jazz or hip hop type dance routines where the cheerleaders may have props including poms, flags, etc. They will perform dance moves, jumps, and turns in formation to predetermined musical accompaniment. There also may be a vocal cheering component.

“Stunting”- Athletic gymnastics skills

Gymnastic skills include artistic gymnastic floor routine components. Some trampoline skills may be performed during high-level stunts.

Stunting is a combination of gymnastic-type maneuvers with partner and small group components. It essentially involves the stacking of team members into formations. Smaller team members (flyers) are lifted or thrown into positions of sitting or standing on to the shoulders, hands, or outstretched arms of one or two stronger team members’ (bases).

The flyer is then ‘popped’ or ‘cradled’ down. A ‘pop’ consists of the flyer being tossed a small distance into the air, and maintaining a strong standing body position while one or more bases slow the flyer down by catching her waist on her descent- lowering her to the ground so she lands on her feet. A ‘cradle’ is another common method of bringing the flyer back down to the ground by first throwing her up into the air. Once airborne, the flyer will attempt to lift her hips and legs to transfer her body into a horizontal position. As she begins her descent, one or more bases will catch her by the shoulder girdle and thigh in a carrying/cradling type position. She is then assisted into a standing position on the ground. During the cradle, the flyer may complete one or more full body rotations in the air referred to as ‘twists’.

Pyramids are built by connecting one person to another via various types of stunts.

Basket tosses are an advanced skill where three or four bases from the team throw a flyer into the air. The flyer will perform a gymnastic skill such as a toe touch, back tuck, layout, etc. in the air, and then will be caught by the bases in a cradle.

Spotters are additional team members that are not directly involved with a stunt. The role of the spotter is to be standing close by and watching the stunt attentively in the case that an error occurs. If the stunt is not working
anticipated, the spotter will step in to assist in catching the flyer or preventing a fall.

**Stunting skill limitations in Saskatchewan:**

Stunting, dismounts, tosses, pyramids, spotting, mascots, props, gymnastics, and age levels and requirements are described in pages 14-16 of the Saskatchewan Cheerleading Association 2008-2009 Rule book. The limitations and permissible movements are all described in detail, with corresponding competitive point deductions.

**Environment**

**Flooring**

For Saskatchewan, most cheerleaders in elementary and middle years have mats required for stunting practices, if stunting during games, and competition. This requirement is enforced by the associated school from which the cheer team is based. The Saskatchewan Cheer Association recommends using mats for all stunting, but it is not required for any age level.

**Weather**

During non-ideal weather circumstances, it is suggested that only low-level stunts be performed with additional spotters.

**Uniform**

No jewelry is allowed. The stunting uniforms are fitted and flexible material without sharp edges. Pom cheerleaders may wear cheer shoes, dance shoes or jazz runners. Stunt cheerleaders wear cheer shoes. Cheer shoes have soft rubber soles that have rounded edges and modified soles to allow bases to grip the flyers more securely. They lace up securely and provide good grip on different surfaces.

**Coaching**

**Coaching certifications:**

*Tumbling* - Gymnastics Canada has regulations educational levels for tumbling techniques. These are advised but not mandatory.

*Stunting* - All coaches are encouraged to undergo certification through the National Coaching Certification Program (NCCP). There are also specific cheer-
coach educational coaching levels provided in the United States by The American Association of Cheerleading Coaches and Advisors (AACCA), and in Alberta by the Alberta Cheer Association (ACA) that some coaches have. As of 2011, Saskatchewan coaches are required to take the ACA coaches certification.

"First-aid- At least one coach per team must be certified in first aid. Medical information, waivers, and first aid kits are required to be at all practices, games and competitions.

To become a fully certified SCA coach, the theoretical (NCCP), practical (SCA/ACA), and practical (minimum number of coaching hours) aspects must all be fulfilled.

Coaching safety workshops:

The SCA puts on coaches workshops that attendance is encouraged for. The day provides information on rules and regulations, coaching skills and techniques, safety and training components. This day provided at a nominal fee, again, advised by not mandatory.

Typical practice:

Generally, a practice will consist of a warm-up component, skill practice, skill acquisition, technique instruction, routine repetition and a cool down. There are no time limits or restrictions for practices in Saskatchewan.

Cross-training:

In Saskatchewan, at the professional level and some collegiate levels, supervised weight training and cardio sessions are mandatory.

Health awareness:

The professional level cheerleaders in Saskatchewan have access to fitness trainers, fitness information, nutritional guidance, safety education and physical therapy free of charge during the 2009 season. The team is strongly encouraged to access any required services as appropriate. The open/adult level has access at fee-for-service. The collegiate level may or may not have a cross-training fitness requirement. All other levels have fee-for-service access.