ABSTRACT

FORMER TEAM SPORT ATHLETES’ EXPERIENCES OF THE PHYSICAL AND PSYCHOLOGICAL EFFECTS OF SPORT-RELATED CONCUSSION

by Megan Cosmo Lee Loftin

This study presents the results of a phenomenological qualitative analysis of former team sport athletes’ experiences of physical and psychological effects of sport-related concussion. Concussions have become increasingly prevalent in sport and knowledge surrounding the injury has become more available. Most research on sport-related concussions has focused on return to play and the physiological aspects of the injury; however, concussed individuals may also suffer psychological symptoms. Former athletes are experiencing health issues due to the physical and psychological nature of this injury. This study sought to add to this literature by exploring what physical and psychological effects former high school/collegiate team sport athletes experienced because of a sport-related concussion and the meanings they make of (how they experienced) these physical and psychological effects of a sport-related concussion.
FORMER TEAM SPORT ATHLETES' EXPERIENCES OF THE PHYSICAL AND 
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Chapter 1
Introduction

With sport participation rising worldwide, there is much research documenting the many potential benefits that such participation provides. These potential positive outcomes of sport participation range from being physically active (Weiss, Smith, & Stuntz, 2008) and developing leadership skills (Camire & Trudel, 2010) to the enhancement of life satisfaction (Gilman, 2001) and development psychosocial and life skills (Cote, Strachan, & Fraser-Thomas, 2008). At the same time, however, negative outcomes of sport participation also exist. For example, sports-related injuries represent a significant potential health concern for all those who participate. In particular, there is growing concern about the increased incidence of sport-related concussion. Concussion has been defined as “a brain injury that is a complex pathophysiological process affecting the brain, induced by biochemical forces” (Kontos, Covassin, Elbin, & Parker, 2012, p. 1752; McCrory et al., 2013). It can be caused by a direct blow to the head, neck, face or elsewhere on the body with an “impulsive” force transmitted to the head. An example of this on the football field is a linebacker tackling the quarterback with his head down. The brain does not fit snugly in the skull, but rather floats in cerebrospinal fluid so when the brain is exposed to rapid acceleration, deceleration and/or rotational forces, the head in motion stops suddenly. This sudden stop causes the brain to compress into the skull and compresses again as it rebounds against the opposite side of the skull. Per the American Association of Neurological Surgeons (2005), there is a potential for tearing of blood vessels, pulling of nerve fibers and bruising of the brain substance. This injury typically results in the rapid onset of short-lived impairment of neurological function as the brain goes into crisis mode, directing all energy to healing itself (Grady, 2010). Therefore, impairment is observed in other brain functions like memory, motor control and concentration. However, most concussions resolve quickly; in fact, one study found that 80-90% of concussions were resolved within a 7-10-day period (McCory et al., 2009). However, in some cases, symptoms persist beyond this 7-10-day time frame. Long-lasting impairment is referred to as post-concussion syndrome, defined by a collection of symptoms that some people develop after they have had a concussion (Leddy, Sandhu, Sodhi, Baker, & Willer, 2012).

Incidence of Concussion

Approximately 1.6 to 3.8 million sport and recreational activity-related concussions occur
annually (Covassin, Moran, & Wilhelm, 2013). There has been a steady increase in concussion rates in both high school and college athletes for over twenty years (Daneshvar, Nowinski, Mckee, & Cantu, 2011). In the late 1990s, it was reported that 300,000 concussions occur annually in the United States (Thurman, Branche, & Sniezek, 1998). According to Powell and Barber-Foss (1999), more than 62,000 concussions are sustained each year in high school contact sports. Additionally, emergency room visits from 1997 to 2007 for sport-related concussions doubled for 8-13 year olds and increased by more than 200% for 14-19 year olds (Bakhos, Lockhart, Myers, & Linakis, 2010). It has also been estimated that 53% of high school athletes sustained a concussion before participation in high school sports, and 36% of collegiate athletes have a history of multiple concussions (Gessel, Fields, Collins, Dick, & Comstock, 2007). Furthermore, Gessel et al. (2007) found that high school athletes who have been concussed are three times more likely to suffer another concussion in the same season. Because the frontal lobes of the human brain continue to develop until age 25, it is vital to manage youth and collegiate players’ concussions very conservatively to ensure optimal neurological development and outcomes (Gessel et al., 2007). The continued increase in sport-related concussions does not necessarily mean that more concussions are occurring (though the increasing numbers of individuals participating in sport is also a factor), but rather that more athletes have become educated on concussions and thus are more open to reporting the symptoms they are experiencing. However, this is only part of the story as research tells us there is still difficulty in recognizing and diagnosing concussions, and therefore numerous head injuries go undetected. Hence, the number of concussions reported each year are also likely an underestimation of the true incidence of concussions (Thurman et al., 1998). Delaney, Lacroix, Leclerc, and Johnston (2002) found that 62% of soccer players and 70% of football players experienced symptoms of a concussion during the previous 2001 season. Furthermore, they discovered that 20% of Canadian varsity football and soccer players felt symptoms commonly associated with a concussion (e.g., dizziness, headache) and continued to play without reporting the symptoms. This suggests that athletes may not report concussion symptoms. Just why they do not has begun to receive research attention and fear of being removed from competition has been found to be one influential factor. For example, when high school athletes were asked why they did not report their concussion symptoms, Gregory (2010) found that they did not think their symptoms were serious enough to bring up (66%), did not want to leave the game (41%), and/or did not want to
let their team down (22%). If athletes are not reporting their concussions, how we can help them?

Athletes who participate in North American sports of football and ice hockey in particular are considered to be at a high risk for suffering a sport-related concussion (Caron, Bloom, Johnston, & Sabiston, 2013). Research has found there are also many head injuries in soccer (Caron et al., 2013) and that the concussion rate in soccer is comparable to football and ice hockey (Delaney et al., 2002). Research in the 1990s found that for males, the greatest number of concussions occurred for athletes that participate in football, and for females, soccer (Powell et al., 1999). In organized high school sports, it was found that concussions occurred more often in competitive sports than non-contact sports, with football accounting for more than 60% of concussions (Powell et al., 1999). Recently, a study was conducted to describe the epidemiology of sport-related concussions in 25 National Collegiate Athletic Association (NCAA) sports (Zuckerman, Kerr, Yengo-Kahn, Wasserman, Covassin, & Solomon, 2015). Data from the NCAA Injury Surveillance Program during the 2009-2010 to 2013-2014 academic years were analyzed. The results found that the highest concussion rates occurred in men’s wrestling, men’s hockey, women’s ice hockey, and men’s football. Additionally, men’s football had the highest annual estimate of reported sport-related concussion, followed by women’s soccer and women’s basketball. Additionally, the study also found that sport-related concussions occurred in competitions more so than in practice, and further, most concussions occurred from inter-player contact (Zuckerman et al., 2015).

**Concussion Symptoms and Diagnosis**

Symptoms of a concussion may be immediate - occurring directly after impact - or transient - taking some time to appear and persisting for an extended period of time (McCrorvy et al., 2009). According to the University of Pittsburgh’s Department of Neurological Surgery, an athlete who has suffered a concussion may appear to be dazed or stunned; may be confused about an assignment; may forgets plays; may be unsure of game, score or opponent; may move clumsily; may answer questions slowly; may lose consciousness (even temporarily); may show behavior or personality changes; may forget events prior to hit; and may forget events after hit (Aubry et al., 2002). It is important to note that contrary to popular belief, loss of consciousness occurs in less than 10% of concussions. In a study conducted at the University of Pittsburgh Medical Center (UPMC) on high school and college athletes with concussion, on-the-field amnesia, not loss of consciousness (as long thought) was predictive of post-injury symptom
severity and neurocognitive deficits (Aubry et al., 2002). Additionally, common signs of a concussion reported by athletes include: headaches, nausea, balance problems or dizziness, double or fuzzy vision, sensitivity to light or noise, feeling sluggish, feeling “foggy”, change in sleep pattern and concentration or memory problems. Typically, signs and symptoms following a concussion can be physical, cognitive, or emotional, and these symptoms can appear alone or in combination (Kay et al., 1993; Kissick & Johnston, 2005).

According to the 3rd International Conference on Concussion in Sport, diagnosing a concussion spans five different domains: symptoms, physical signs, behavioral changes, cognitive impairments, and sleep disturbance (McCrory et al., 2009). If symptoms within any of these five components are present, a concussion should be suspected and the athlete must be removed from play and medically assessed (McCrory et al., 2009). Certified health professionals may use one of several available sideline assessment tools that include questions to evaluate athletes’ orientation and memory, and assessments of their postural stability in different positions (Halstead & Walter, 2010). From there it is imperative to provide athletes with proper education, support and encouragement to help them safely return to their sport (Kissick et al., 2005) or a decision of when to remove an athlete from the competitive season or recommend permanent retirement from competition (Sedney, Orphanos & Bailes, 2011) should be made.

Part of what makes a concussion so unique is that it is an “invisible injury,” making it very difficult for a casual observer to identify the athlete as injured (Bloom, Horton, McCrory, & Johnston, 2004). This creates a multitude of problems. Many athletes are not aware of the signs and symptoms of concussions or the severity of concussions, or they may feel pressure from coaches, parents/guardians, and teammates to return to play as quickly as possible. Athletes tend to believe that it shows strength and courage to “tough it out” and play when they are injured (McLellan & McKinlay, 2011). The actions caused by this belief can have dangerous implications, such as putting athletes at risk for a serious injury known as second impact syndrome. Second Impact Syndrome occurs when an athlete sustains a second, often minor head injury before symptoms associated with the first head injury have completely subsided (Boden, Tacchetti, Cantu, Knowles, & Mueller, 2007). Ultimately, returning an athlete to participation prior to complete recovery may increase the risk of lingering, long-term, or catastrophic neurologic ramifications (Collins, Lovell, Iverson, Ide, & Maroon, 2006). Indeed, we continue to see in the media anecdotal accounts of professional athletes who discuss their sport-related
concussion (Caron et al., 2013; Gulli, 2011). Specifically, one professional athlete indicated that he went from being a person who enjoyed spending time around other people to someone who just wanted to be left alone and did not want to communicate with others. Another professional athlete indicated feeling trapped in his own brain. Ruben Echemendia, a neuropsychologist and chair of the concussion working group for the National Hockey League (NHL) and the NHL Players’ Association, notes that these anecdotal accounts are useful, because “when people start to recognize that their idols have really struggled because of concussive injuries, it starts to wake them up and move them away from the athletic culture of needing to be Superman” (Gulli, 2011, p. 3).

**Summary**

In sum, most research on sport-related concussion has focused on return to play and the physical symptoms and outcomes of the injury (Johnston et al., 2004; McCrory et al., 2009, 2013). In contrast, a limited body of research has investigated psychological aspects of a concussion (Bloom et al., 2004; Covassin, Swanik, & Schatz, 2007; Hutchison, Mainwaring, Comper, Richards, & Bisschop, 2009). Given that more people than ever are participating in recreational and competitive sports, a greater understanding of the psychological (both cognitive and emotional) dimensions of sport-related injury (Mainwaring et al., 2004), including sport-related concussions, is needed. Further, there is a paucity of research exploring high school and collegiate athletes’ *experiences* of physical and psychological effects of sport-related concussion. That is, little of the research on the physical and psychological aspects of concussions has used a qualitative framework. Previous qualitative research in sport psychology has indicated that in-depth qualitative interviews are an effective method for understanding the experiences of athletes (Culver, Gilbert, & Trudel, 2003). A qualitative approach allows the researcher to illuminate the complexity and nuances of the social phenomenon of interest (Mason, 2002). A *phenomenological* qualitative approach seeks to understand a social phenomenon as described by individuals who have experience of it (Creswell, 2013). Hence, a phenomenological study with former athletes who have sustained a sport-related concussion was undertaken to provide insight into their lived experiences of sport-related concussion, embedding those experiences in the contexts of high school or collegiate sport. Findings may help improve the classification, management, and assessment of concussions (e.g., implementing depression or emotional disturbance questionnaires during baselines testing of athletes, and again after sustaining a sport-
related concussion, the way medical professionals implement neurocognitive testing). Further, and perhaps most importantly, results of the study will allow health professionals (e.g., medical doctors, athletic trainers, physical therapists) who work with concussed athletes, as well as coaches, family members, sport psychology consultants, teammates, and athletes themselves to better understand the physical and psychological effects of concussions, and hopefully to take more care of, and provide better care and support for, these athletes.

**Purpose of the Study**

The purpose of this research was to explore former team sport high school (club or interscholastic) and collegiate (club or intercollegiate) athletes’ experiences of the physical and psychological effects (i.e., cognitive and emotional) of a sport-related concussion. More specifically, the research sought to explore how these athletes experienced sport-related concussions in terms of their continued involvement with their sport/team; sense of themselves as an athlete; academic engagement and performance; relationships with friends and family; physical symptoms; and psychological effects (including cognitive functioning and experiences of mood swings and depression).
Chapter 2

Literature Review

As noted, the purpose of this research was to explore former team sport high school (club or interscholastic) and collegiate (club or intercollegiate) athletes’ experiences of the physical and psychological outcomes (i.e., cognitive and emotional) of a sport-related concussion. This chapter further reviews the research literature related to this topic. Specifically, research on the management and return to play aspects of sport-related concussion and the signs and symptoms of sport-related concussion in relation to the physical, cognitive and emotional aspects of the injury are addressed first. This literature review then discusses the extant research that has examined the cognitive demands athletes face and the contexts of a sport-related concussion, including athletic identity and the culture of risk. Finally, this literature review concludes by presenting what previous research has found on the common psychological (emotional) responses and effects of sport-related concussion.

Management of Concussion and Return to Play Decisions

Researchers are starting to understand the long-term effects that athletes may suffer from sport-related concussion (Sedney, Orphanos, & Bailes, 2011) and the management and return to play decisions that could lead to long lasting consequences for athletes. The management of concussion is largely devoted to keeping the athlete safe while the supply and demand mismatch of energy resolves in the brain (Lovell, Collin, & Bradley, 2004). Thus, resting both mentally and physically after the injury is imperative to the health of the athlete. Most athletes recover over the course of 1-2 weeks but some athletes may take months to completely recover depending on the severity of the concussion (Leddy et al., 2012). It is the athletes who take longer to recover who provide the most interest and concern for researchers because of the long-term consequences they must endure. There are several factors that seem to influence recovery time, including concussion history, age, and gender. That is, sustaining multiple concussions can lead to long-term neurocognitive deficits and subsequent concussion; high school athletes take longer to recover from a sport-related concussion than college athletes (Lovell et al., 2004); and females are more likely to sustain a concussion, tend to have more symptoms, and require more time to recover compared to males (Moser, 2012). It is crucial that athletes do not return to play while still experiencing any symptoms of a concussion because it can lead to post-concussion syndrome or in extreme cases, can lead to further brain injury (Lovell et al., 2004).
The Vienna, Prague and Zurich International Conference on Concussion in Sport recommendations established a management and return to play protocol to reduce the occurrences of athletes returning to play too soon. For this organization, the basis of concussion management is physical and cognitive rest until asymptomatic and then a stepwise program of exertion before being medically cleared to return to play (as discussed in McCrory et al., 2009). Activities that require concentration and attention (school work, video games, text messaging) may worsen symptoms and potentially delay recovery. Most injuries will resolve spontaneously over several days and these athletes are expected to proceed progressively through a six-step return to play protocol. In the first stage, no activity is permitted. In the next phase, light aerobic exercise is allowed. In the third stage, sport specific exercise is introduced. In the next phase, the athlete can return to practice with non-contact training drills followed by the fifth stage where full contact is permitted in practice. Finally, in the last stage the athlete can return to normal game play. With this graded return to play progression the athlete should only continue to the next level if asymptomatic at the current level. Generally, this stepwise progression would take approximately one week with each step taking 24 hours. If any post-concussion symptoms occur while in the stepwise progression, the athlete should drop back to the previous asymptomatic level and try to progress again after a 24-hour period of rest (McCrory et al., 2009).

Current literature on concussion recovery is inconsistent as individual experiences of a sport-related concussion are so vastly different. This diversity makes trying to predict how long symptoms will last extremely difficult (Iverson & Schatz, 2015). Social pressure from family, coaches, agents, and teammates may drive the athlete to return to play despite persistent symptoms, thereby increasing the athlete’s risk of concussion and potential for persistent problems (Sedney, Orphano & Bailes, 2011). Sport psychology research reveals that athletes may be physically healed and rehabilitated but not necessarily psychologically prepared to return to competition following an injury (Podlog & Eklund, 2004). Sometimes symptoms last long enough to require athletes to consider retirement from their sport. Research on the symptoms of sport-related concussion is discussed next.

**Symptoms of Sport-Related Concussions**

As briefly discussed in the Introduction, symptoms following a concussion can be physical, cognitive, and/or emotional and these symptoms can appear alone or in combination (Kay et al., 1993; Kissick et al., 2005). Self-reported physical symptoms of concussion include
nausea, vomiting, dizziness, sleep disturbance, fatigue, headache, blurred or double vision, altered sense of taste and smell, sensitivity to light or noise, and balance issues (Kay et al., 1993; Kissick et al., 2005). Cognitive problems commonly reported by athletes include disturbances in attention, concentration, perception, memory, speech and language, speed of information processing and executive functions (Kay et al., 1993; Kissick et al., 2005). Self-reported emotional symptoms are irritability, anger, anxiety, depression, disinhibition (i.e., impulsivity.), emotional liability (i.e., involuntary crying), feelings of loss, and feelings of helplessness (Kay et al., 1993). Depression, isolation, and anxiety have been identified as the most common emotional responses by athletes to concussion (Guskiewicz et al., 2007; Johnston et al., 2004). In fact, functional Magnetic Resonance Imaging (fMRI) scans of concussed individuals indicated similar neural responses in brain areas commonly linked with major depression (Chen, Johnston, Petrides, & Ptito, 2008). The Centers for Disease Control and Prevention (CDC) reported that sleep disturbances were a sign of a concussion reported by athletes. Sleep disturbances found included drowsiness, difficulty falling asleep, and sleeping more or less than usual (Center for Disease Control, 2003; Halstead & Walter, 2010).

As noted, some symptoms “go hand in hand”. Cognitive deficits related to concussion include decreased speed and efficiency of information processing, increased distractibility and decreased ability to sustain one’s attention. These impairments may result in frustration, anger, confusion, depression, and overwhelming feelings of failure. Additionally, individuals with concussion no longer think as efficiently or as logically as they once did which may result in loss of self-esteem (Ruff, Camenzuli & Mueller, 1996). In some early research on brain injury survivors, Bennett (1989) found these reactions are especially prevalent in individuals who were always over-achievers, had high self-expectations, and whose feelings of self-worth were tied to their achievements.

One complication that occurs when concussions are not diagnosed or athletes return to play before complete recovery is suffering a second blow to the head while recovering from an initial concussion. This is known as second impact syndrome (SIS). In a study of high school and college football players, 94 cases of SIS were observed over a 13-year period, with 8 of those cases resulting in death (Boden et al., 2007). Though this condition is rare, it is still important to note as a possible consequence of sustaining a concussion.

Another major complication of concussion that occurs more often than SIS is prolonged
symptoms. This phenomenon is known as post-concussion syndrome. Research shows that post-concussion syndrome can be quite debilitating for an athlete and in some cases, such symptoms can be permanent and disabling. According to Lovell and Collins’ (1999) research with college football players, symptoms of post-concussion syndrome include chronic headache, fatigue, sleep difficulties, personality changes (e.g., increased irritability, emotionality, and sadness), sensitivity to light or noise, sensation of being “in a fog”, confusion/disorientation and balance problems. In some cases, post-concussion symptoms were found to lead to career termination (Caron et al., 2013). Additionally, post-concussion confusion has been attributed to impaired cognitive functioning. Paniak and colleagues (Paniak, Reynolds, Phillips, Toller-Lobe, Melynk, & Nagy, 2002), in a study of 118 patients with mild traumatic brain injury, reported that cognitive disturbances including “doing things slowly,” “difficulty thinking clearly,” “poor concentration,” “difficulty planning,” and “forgetfulness” best differentiated individuals with mild brain injuries and healthy normal controls.

While our understanding of common signs and symptoms of sport-related concussion has increased, what has been little explored are athletes’ experiences and perceptions of the symptoms - both physical and psychological - of sport-related concussions. Further, it is essential to consider how cognitive demands that athletes face, the contexts of sport today, as well as emotional responses to concussion, may vary by level of sport participation (recreational to professional) in which the concussion occurred. The research on these topics are discussed next.

**Cognitive Demands**

Research indicates that high school and collegiate student-athletes may well face a different level of challenge from professional athletes during their recovery from a sport-related concussion. The key difference has to do with the academic and cognitive demands placed on amateur (high school and college) athletes that professional athletes do not face. Studies dedicated to understanding the impact concussions have on cognitive abilities have increased though there continues to be a lack of research that qualitatively explores the cognitive demands of athletes who have sustained a sport-related concussion.

McCrory et al. (2009, 2013) defined cognitive rest as the practice of limiting activities requiring concussion patients to pay attention, use memory, or use reasoning abilities. Multiple researchers (Grady, 2010; Majerske et al., 2008; McLeod & Gioia, 2010; Sady, Vaughan, & Gioia, 2011) have found that when a student-athlete participates in cognitive activities prior to
full recovery from concussion, risk of further injury or delayed recovery occurs. Moser, Glatts, and Schatz (2012), for example, conducted a study of high school and college student-athletes who suffered a sport-related concussion to evaluate the usefulness of cognitive and physical rest for treatment. These athletes had sustained a concussion between April 2010 and September 2011 and were prescribed at least 1 week of cognitive and physical rest as part of their concussion management plan. This plan also included several other restrictions including no homework or classroom activities, no texting and use of phones unless necessary, no trips outside of the home, and no video games. Participants were assigned to groups based on the time between sustaining their concussion and their first post-concussion assessment at Sports Concussion Center of New Jersey where the study was conducted (1-7 days, 8-30 days, and 31+ days). Participants were measured on the Concussion Symptom Scale and the Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT) Test. The results demonstrated improvements on neuropsychological testing and in symptoms after a period of 1 week of rest with significant comparable improvement despite time from concussion. This study demonstrated that a period of cognitive and physical rest may be a useful means of treating concussion-related symptoms, whether applied soon after a concussion or weeks to months later (Moser et al., 2012). However, the researchers noted that their research was preliminary and limitations included a convenience sample and no control group. Additionally, the quality of rest was not clearly defined.

Another study that examined the effect of cognitive activity level on duration of post-concussion symptoms focused on athletes at the Sports Concussion Clinic who had been diagnosed with a sport-related concussion or concussion resulting from a similar mechanism, such as a fall at a playground (Brown, Mannix, O’Brien, Gostine, Collins, & Meehan, 2014). Athletes (n=335) between the ages of 8-23 completed the Post-Concussion Symptoms Scale (PCSS) and a scale that recorded their average level of cognitive activity since their last visit. The cognitive activity scale consisted of complete cognitive rest (no reading, homework, text messaging, video game playing or similar activities), minimal cognitive activity (no reading, homework, less than 5 text messages per day and less than 20 minutes per day of combined online activity and video games), moderate cognitive activity (reading less than 10 pages per day, less than 20 text messages per day and doing less than 1 hour of combined homework, online activity and video games per day), significant cognitive activity (reading less, doing less
homework, working online less and text messaging less than you would normally do but more than in the minimal cognitive activity level), and finally, full cognitive activity. This scale was developed by 2 clinician researchers experienced in concussion management (Brown et al., 2014). The study found that athletes who engaged in the highest levels of cognitive activity took the longest amount of time to resolve their concussion symptoms.

Brown et al.’s (2014) findings were similar to Moser et al.’s (2012) in that extensive cognitive activity level after concussion is associated with longer symptom duration indicating the need for cognitive rest after sustaining a concussion injury. However, Brown and colleagues’ use of a cognitive activity level scale without previous validation is a limitation. Further, asking study participants to recall their level of cognitive activity was also noted as a limitation. These limitations may explain the contrasting findings of Gibson, Nirgrovic, O’Brien, and Meehan (2013). In their retrospective cohort study of 135 athletes who suffered a sport-related concussion, no significant relationship between the cognitive rest recommendation for the patients and duration of concussion symptoms was found.

Finally, Baker (2016) qualitatively explored the experiences of male and female collegiate-student athletes from three different institutions (housing either Division I, II, or III athletic programs) in meeting academic demands when experiencing prolonged recovery from a sport-related concussion and if they perceived a need for academic accommodations. Results indicated that athletes felt their concussion recovery had a negative impact on their academic performance. They also perceived their recovery increased academic pressures and negatively impacted their concentration ability. Many of the participants expressed difficulty concentrating on assignments or in class for more than 20 minutes at a time. Further, the author noted that there was inequity in the way student-athletes at these three different institutions were treated. There were disparities among these institutions in the academic accommodations student-athletes were allowed. Some students received accommodations such as extended due dates and excused class absences where others in the study received no academic accommodations. The athletes who reported having received accommodations stated that it was helpful in their recovery process. The risk of injury and prolonged recovery when returning to the cognitive demands of academics before normal neurometabolic functioning has occurred is well documented in the research (Grady, 2010; Majerske et al., 2008; McLeod et al., 2010; Sady et al., 2011), but has not been explored in the context of former athletes’ experiences of the physical and psychological effects
of a sport-related concussion. The cognitive demands that high school and collegiate student-athletes face should be considered in future research.

**Contexts of Sport-Related Concussion**

Athletic identity, the culture of risk, and the psychosocial implications of concussion have also been explored within sport psychology. Athletic identity refers to the degree to which an individual defines himself or herself in terms of an athletic role (Brewer, Van Raalte, & Linder, 1993). Individuals who are intensely involved with athletics and receive encouragement for their participation may focus their self-identity on the role of an athlete (Mainwaring et al., 2004). Brewer and colleagues (1993) stated that individuals with strong athletic identities are more likely to interpret a given event in terms of its implications for their athletic functioning compared to individuals who only weakly identify with the athletic role. Individuals who derive their self-identity exclusively from their role as an athlete are also more prone to experiencing emotional disturbance (i.e., depression) following a sports-related injury, because their self-worth and self-identification are exclusive to sport. The influence of injury on athletic identity and the psychological reactions to injury have not been widely explored. However, as suggested above, the research that has been conducted suggests that individuals whose self-worth is derived exclusively or predominantly through athletic performance are more likely to appraise their injury in terms of a threat or loss which in turn may result in post-injury emotional disturbances and lowered self-esteem (Brewer et al., 1993). Brewer and colleagues (1993) found that a strong and exclusive identification with the athletic role was associated with depression following injury, with participants higher in athletic identity reacting more negatively to injury, imagined or real, than participants lower in athletic identity.

The culture of sport should also be considered in relation to athletes’ experiences of sport-related concussion because sport culture often encourages and/or rewards pain and injury for athletes in that playing through or enduring pain and/or injury is a way to gain respect. However, playing through pain or injury puts athletic performance ahead of athlete safety (McGannon, Cunningham, & Schinke, 2013). This concept has been termed a *culture of risk* by sport sociologists. In one of the first studies to look at a culture of risk in sport, Frey (1991) wrote a conceptual paper with the purpose of expanding on the relation of risk to sport by defining risk and giving an overview of the sociology of risk. Frey begins by defining risk as anything that scares us, which fails to acknowledge the multidimensionality of risk. Therefore,
Frey uses Sigelman’s (1985) definition of risk as an uncertain outcome in which the possibility of significant loss or gain is present. This definition includes how we may not be aware of all the risks in a given situation and that any given situation may represent a risk setting even if we are not aware of it. What is also emphasized is the notion that risk is often neglected in relation to the cultural and political dimensions of the environment; emphasis is limited to a cost/benefit analysis. This does not capture the whole story because culture defines what is or is not risky. Risk then is whatever is defined as risky at a particular time, in a particular place, by a particular group of people. Frey then moves to an assessment of the impact on the social fabric of risk analysis and notes that choices of risk or responses to potential risk vary by social class, by the distribution of power or the ability to control the impact of risky events, and by other social categories. This can be applied to sport in the sense that risk taking is viewed positively because taking risks to win is more highly valued (and even glorified through game highlights on ESPN’s Sports Center, for example) than playing it safe. Finally, Frey moves to an application of risk in relation to the sociology of sport. The first point the author makes regards the social problems associated with sport, especially for athletes. Athletes are the ones who deal with the most risk yet have the least amount of power in terms of deciding what is or is not risky. As sport becomes rationalized, risk is reduced which takes away from the possibility of excitement and thrill. However, gamblers have recognized that not every aspect of sport can be controlled. You can never be certain of an outcome in sport which still appeals to gambling and serves to amplify the risk associated with games. Frey maintains that sport may also provide clues to flaws in the social fabric. There have been increases in violence, drug use, conflict and fraud within sport that supports the notion that sport detracts from institutionalized social arrangements. It is intended to be a relief from other aspects of life but as it becomes so entwined with other social institutions, it makes us more aware of risks to the social fabric (e.g., strained social relations rooted in race and gender). Additionally, risk perception is a crucial factor in an athlete’s decision to participate in sport, which Frey describes as people underestimating the amount of risk in a situation (e.g., athletes will assign zero risk to an action or event when the feeling of invincibility or ‘megalomania’ is experienced). Finally, it must be understood that every situation provides an opportunity to demonstrate self, but also risk to self in a situation where the actor, or in this case the athlete, is willing to face uncertainty. When studying or analyzing sport and injury, it should include the dimension of risk and consideration of sport’s culture of risk.
Research since Frey’s seminal work has found that both male and female athletes’ identities, experiences, and behaviors are impacted by a culture of risk (Theberge, 2008). Theberge (2008) explored a group of Canadian national team athletes’ accounts of the relationship between sport participation and health. She also explored these athletes’ understandings of the degree and ways they may intervene to reduce or manage the threats to their health posed by their sport participation. Interviews were conducted with 20 individuals from three different sports: 3 male and 4 female field hockey players, 2 male and 4 female rowers, and 4 male and 3 female wrestlers. The semi-structured interviews with athletes discussed a range of issues related to their access to and experiences of working with sport medicine practitioners, experiences of injury and rehabilitation, and their understandings of the relationship between their sport participation and health. Three themes emerged from the data: health and high performance sport, managing the health risks of sport, and making weight: health risks and management. The first theme can be described by athletes’ experiences of understanding that their sport participation posed threats to their health in the sense of reduced functioning and heightened risk of illness based on the volume of work they routinely do. Additionally, athletes also discussed a vague understanding of the toll on their health that their sport participation exacts. The next theme that emerged refers to athletes’ management of the health risks of their sport participation and interestingly, most athletes discussed their bodies as an object to be managed and something that is separate from themselves. The final theme of making weight emerged from the athletes in sport with weight restrictions (i.e., wrestling and rowing). Cutting weight for these athletes was something they had learned to do over time and was typically described as “a challenge”.

The findings of these studies are important in understanding the incidence and consequences of sport-related concussions. The culture of risk in sport may well lead athletes to underreport a concussion and influence how they (and those around them encourage them to) manage a concussion. That is, the culture of risk in sport is a context that must be considered in exploring student-athletes’ experiences of sport-related concussion.

A pilot study that considered this issue was conducted to identify if injury reports of a sample of college rugby players was comparable to previous findings to gain better insights into the actual prevalence and severity of injury in this sport (Madrigal, Robbin, Gill, & Wurst, 2015). Additionally, the authors hoped to gain understanding of a sample of collegiate rugby
athletes’ mentality regarding playing through pain or injury, and whether gender was related to a play through pain and injury mindset. A convenience sample of five male and six female rugby players who were participating in USA Rugby’s National College 7’s tournament were interviewed. The participants represented a wide range of rugby experience as some players had only been playing for 9 weeks while others had been playing for multiple years. The interview guide was created based on the existing literature related to sport injury. The results of the study indicated two major themes with multiple sub-themes. Passion for sport was the first major theme which could be further explained by love of the sport, meaning of the sport, and desire to be on the field. The researchers found that there were various reasons these athletes chose to play and continued playing through pain and injury but the consensus was that passion for the sport stemmed from the love of the game and the meaningfulness of participation which was felt most strongly when they were on the field as opposed to the sidelines. The second major theme was sport ethic, which can be further explained by the sub-themes of helping the team, game time sacrifice, personality (of the athlete), minimize (i.e., downplaying the severity of the injury) and accepted behavior (i.e., not being completely healthy is part of the sport). Athletes wanted to play through the pain to help their team so they were willing to sacrifice their bodies to participate in games.

Athletes indicated that the only two reasons they would not play through pain were if the coach said no or if they believed playing through pain would have an impact on their daily living. A female athlete also mentioned not playing through specific injuries such as a torn ACL or a concussion. According to Madrigal and colleagues (2015), the results of their study emphasize the notion of a culture of risk whereby pain and/or injury tolerance are linked with desirable athlete-attributes of toughness, strength, and commitment (Safai, 2003). Further, because of risk culture and desired athlete-attributes, athlete health and well-being may be threatened or compromised (Safai, 2003).

Specific to sport-related concussion, one study was interested in further understanding sport concussion within a socio-cultural context. Specifically, McGannon and colleagues (2013) were interested in examining the meanings of concussion and the contribution of one socio-cultural context (i.e., sport media) in the construction of the meaning(s) of a sport celebrity’s (i.e., Sidney Crosby’s) concussion and what implications this meaning-making has for sport psychology. Ethnographic content analysis of the mediation of Crosby’s sport-related concussion
identified the overarching narrative prominent throughout the news media as the *culture of risk*. This central narrative was comprised of more complex meanings - the three sub-narratives that the authors labeled *Crosby’s concussion as a cautionary tale, Crosby’s concussion as a political platform, and concussion as an ambiguous injury*. Each of the sub-narratives illuminated and problematized the culture of risk specific to ice hockey, further drawing attention to sport-related concussion as an important health, cultural, and political issue (McGannon et al., 2013). Additionally, this study found that media portrayals of concussion were based solely on physical risks and symptoms with little, if any discussion of the psychological consequences resulting from concussion. The authors noted that this finding is problematic given that sport psychology research on concussion for athletes has repeatedly identified psychological and social consequences, which, if ignored can result in distress, anxiety, depression, and isolation for athletes (Bloom et al., 2004; Caron et al., 2013; Mainwaring et al., 2010; McGannon et al., 2013).

**Emotional Responses to Sport-Related Concussion**

Research on sport-related concussions has examined the psychological aspects of concussions to better understand the short and long-term consequences of this injury (Bloom et al., 2004; Hutchison et al., 2009; Covassin et al., 2007; Caron et al., 2013). More specifically, post-concussion symptoms have been found to exacerbate emotional responses which include anxiety, irritability, and depression (Ptito, Chen, & Johnston, 2007). Several researchers have suggested that these emotional responses exacerbated the overall effect of a concussion (Bailey, Echemendia, & Arnett, 2006; Chrisman & Richardson, 2014; Caron et al., 2013; Gusiewicz et al., 2007; Kontos et al., 2012; Mainwaring et al., 2010). Thus, the physical symptoms of a concussion (e.g., headaches, dizziness) can be amplified when combined with emotional responses, such as depression (Bloom et al., 2004; Johnston et al., 2004; Mainwaring et al., 2004). Covassin et al. (2007) tested the neuropsychological function of 79 collegiate athletes’ post-concussion, and determined that male athletes reported post- concussion symptoms such as vomiting and sadness with greater frequency and intensity than female athletes. Clearly the combination of physical and emotional symptoms presents a significant challenge for athletes who have suffered a sport-related concussion.

Depression is the most-cited psychological disturbance after the occurrence of a concussion, and concussions have been cited as a risk factor for depression. Depression is
defined as a psychological disorder marked by feelings of helplessness, sadness, guilt, and misery. Approximately 180,000 out of 1.6 to 3.8 million Americans who have suffered a concussion are reported to be more likely to suffer a bout of depression later in life. Females have been found to report clinical depression more often than males (Kontos et al., 2012). Concussions are shown to disrupt the chemical balance within the brain, thus making athletes with recurrent concussion more susceptible to depression. The most common signs and symptoms of depression that impede with daily life activities are fatigue, sadness, loss of interest, indecisiveness, sleep problems and irritability. Many of the signs and symptoms of depression overlap with concussion symptoms, making it harder to diagnose the athlete with depression (Iverson, 2006; Kontos et al., 2012). Previous research found that people who have sustained multiple concussions seem to have an increased risk of developing neurodegenerative and psychiatric disorders such as clinical depression (Guskiewicz et al., 2003, 2007). Furthermore, the likelihood of clinical depression seems to increase as the number of concussions increases. Studies suggest that athletes who have sustained one or two concussions are 1.5 times more likely to be diagnosed with clinical depression than athletes with no history of concussions. Athletes who sustained three or four concussions are 3 times more likely to be diagnosed with clinical depression as they get older. The prevalence of clinical depression is very serious because depression correlates to an increased rate of suicide. Clinical studies on individuals with a history of concussions showed a risk of suicide of 18% higher and a risk of suicidal thoughts of 22% higher than the general population (Simpson & Tate, 2007).

In a study focused on retired professional football players, Guskiewicz et al. (2007) investigated the association between Traumatic Brain Injury (TBI) and the likelihood of being diagnosed with clinical depression. To obtain participants for the study, a general health questionnaire was mailed to all living members of the National Football League Players Association – Retired Section. The questionnaire included questions on musculoskeletal, cardiovascular, and neurological conditions that each football player may have experienced during and after their playing days. The neurological conditions section included questions on concussion history and the occurrence of physician diagnosed psychological and medical conditions. The questionnaire also included the Short Form 36 Measurement Model for Functional Assessment of Health and Well-Being (SF-36). Results are based on the responses of 2,552 individuals who completed the questionnaire. Of those individuals, 1,513 players reported
having sustained at least one concussion during their playing years, 884 players reported sustaining one or two previous concussions and 595 sustained three or more. In terms of depression, 269 of the 2,434 or 11.1% of respondents (those with complete data) reported having been diagnosed with previous clinical depression. The findings suggested that football players with three or more concussions were at a three-fold risk of being diagnosed with clinical depression compared to those with limited or no prior history (Guskiewicz et al., 2007). This study provides support for the emotional and psychological effects that athletes deal with long after they retire from sport.

One study was interested in determining depression and neurocognitive performance after concussion among male and female high school and college athletes (Kontos et al., 2012). This study found that high school athletes followed an inverted-U pattern of depression with a return to baseline levels at 14 days’ post-concussion, while college athletes reported increased levels of depression after 14 days. Kontos and colleagues purposed that collegiate athletes increased levels of depression may be attributed to factors specific to the collegiate athlete environment such as high competition levels, stress, and scholarships as compared to high school level athletes. College athletes may also experience isolation from significant sources of social support, whereas high school athletes may have family member and friends more readily available to help them cope with their injury.

At the youth sport level, a history of concussion was associated with a 3.3 fold greater risk for depression diagnosis (Chrisman et al., 2014). More precisely, this study analyzed the association between previous concussion(s) and current depression diagnosis using the National Survey of Children’s Health from 2007-2008. The population of interest for this study was 12-17 years old. To obtain this data, parents who completed the survey were called and asked a series of questions, including whether the child currently had depression and whether the child had previously been diagnosed with a concussion. Other questions included age and sex of child, and parental mental health and income level. These were potential confounders of the relationship between previous concussion and current depression. Logistic regression models were used to analyze the primary predictors, the relationship between each potential confounder and depression, as well as the relationship between previous concussions and current depression while controlling for potential confounders. The results showed that a history of concussion was associated with a 3.3-fold greater risk for depression diagnosis. This association is cause for
some concern, especially considering the population. The authors recommend that clinicians assist by screening youth for depressive symptoms, particularly those who have attained more than one concussion.

A qualitative study with adolescents evaluated concussed adolescents’ and their parents’ perspectives of the effects of a single sport-related on the concussed adolescent’s health-related quality of life (HRQOL) at 1-year post-diagnosis (Iadevaia, Roiger, & Zwart, 2015). Two boys and five girls as well as their parents volunteered for the study and the interviews were centered on the individual’s perceptions of the effect of the sport-related concussion on the adolescent’s physical and emotional function, academic performance, and social interactions. Four themes emerged: significant effect of symptoms, feelings of frustration, negative influence on school attendance and activities, and nature of interpersonal and team relationships (i.e., some participants noted feeling left out of the team, while still receiving overall support from their teammates, and frustration and confrontation were evident in family relationships). The effect of symptoms played the largest role in the individual’s lives as it played a role in the emergence of all the other themes (Iadevaia et al., 2015). Again, this emphasizes the idea that concussion symptoms go hand in hand and this interaction is just a part of the multiple consequences of sustaining a concussion.

In another study, Mainwaring and colleagues (2010) were interested in understanding the emotional response to sport concussion compared to anterior cruciate ligament (ACL) injuries because prior to this study no research had examined whether different emotional responses are experienced by athletes with different types of sport-related injuries: musculoskeletal vs. concussion. This is important because it is not clear if different patterns of emotional sequelae are associated with different types of injury. Specifically, this study examined and compared emotional disturbance and depression following sports concussion and musculoskeletal injury relative to un-injured controls. Participants included 16 concussed athletes, 7 ACL injured athletes, and 28 controls from various varsity team sports on a college campus. Baseline emotional states for all athletes were measured during a 60-minute pre-season medical and neuropsychological assessment. When possible, athletes were scheduled for post-injury assessment on days 1 (date of injury), 4, 8, 15, 22, and 29, however, this was not always the case. Injured athletes completed Time 2 assessment on average of 3.6 days’ post-injury for concussion athletes and 11 days’ post-injury for ACL athletes. Pre- and post-injury emotional responses
were assessed with a shortened version of the Profile of Mood States (POMS). The study found that athletes with ACL injury reported higher levels of depression for a longer duration than athletes with concussion. Relative to un-injured controls, athletes with concussion reported significant changes in Total Mood Disturbance and Depression post-injury whereas athletes with ACL injuries reported significant changes in Depression sources only. These results indicated that there are different patterns of emotional disturbance associated with different injuries (Mainwaring et al., 2010). This is an important rationale for continued research on the psychological effects of sport-related concussion. Sport psychology research reveals that athletes may be physically healed and rehabilitated but not necessarily psychologically prepared to return to competition following an injury (Podlog & Eklund, 2004). Thus, it is imperative to continue research to understand the experiences of athletes after sustaining a concussion. Are we asking athletes if they are psychologically prepared to return to play after such an injury and if not, how can we know they are truly ready to return?

Bailey and colleagues (2006) intended to look at whether an athlete’s motivation level impacted neuropsychological testing after sustaining a mild Traumatic Brain Injury (mTBI). This study had important implications because the information used in the neuropsychological tests determine if an athlete can return to play. Therefore, an athlete can be motivated to minimize symptoms post-injury to increase the likelihood of returning to play. The purpose of this study was to determine if possible changes in motivation experienced by athletes from baseline testing to post-injury testing resulted in notable changes in neuropsychological performance. The authors hypothesized that athletes with suboptimal motivation at baseline would demonstrate larger changes between their baseline and 1-week post-injury testing and the changes between baseline to 1-week post-injury would be an improvement over their baseline testing despite obtaining a mTBI. Data for this study were obtained from the Penn State Concussion Program. Before first year athletes started playing with their respective teams, neuropsychological tests were taken to determine baseline results. If the athlete sustained a mTBI, neuropsychological testing occurred again. Those that completed the baseline testing and 1-week post-injury testing were used for this study. The athletes were then divided into two groups: the Suspect Motivation Baseline (SMB) and the High Motivation Baseline (HMB). The athletes may have fallen into one or the other group for each test administered but no one individual fell into the SMB group for every test. The tests included: Symbol-Digit Modalities Test (SDMT), Trail Making Test (TMT),
Controlled Oral Word Association (COWA), Digit Span Test (DST), Stoop Color-Word Test (Stoop), and the Vigil. The results supported the hypothesis that suboptimal motivation at baseline may impact athletes’ test performance, causing them to show significant improvement post-injury due to changes in motivation (Bailey et al., 2006). Though, more tests are necessary to determine how much motivation plays a role in neuropsychological testing initial evidence from this study shows that it does.

Finally, as noted earlier, most research on sport-related concussions has concentrated primarily on the physical symptoms and return to play aspects that athletes face. Less research has focused on athletes’ experiences and perceptions of the physical and emotional outcomes of sport-related concussions. One exception to this is a qualitative study that explored the lived experiences of former National Hockey League (NHL) players who suffered multiple concussions while playing in the league (Caron et al., 2013). Some of the specific research questions of this study included: How do NHL players who retired because of suffering multiple concussions experience career termination and transition? What role do social relationships play in the experience and recovery from a concussion? Lastly, how are NHL players affected physically and psychologically by multiple concussions? Five NHL players were interviewed. These individuals played more than 10 years in the league, had been retired for at least four years and had suffered multiple severe concussions. An interview guide was created and the authors borrowed from interpretive phenomenology to conduct their analysis. The participants were asked to give information on what they experienced and how they experienced their concussions as well as the long-terms effects.

The themes that emerged from the interviews included the ambiguous description of their concussion events, physical symptoms, isolation and withdrawal, emotional turmoil, social influences and support, and transition out of sport. Uncertainty of concussion events described these player’s experiences as being unsure of how many concussions they had sustained during their career and not having the support to get medical attention even if they knew they had a concussion. Some of the physical symptoms the participants described were headaches, sleep patterns, dizziness and vision problems. When players were concussed they felt isolated from their team which many described as a family to them so they often felt alone and withdrawn. This also led to the participants feeling emotional turmoil such as stress, confusion and depression. Some of them described the emotional turmoil as anxiety surrounding the uncertainty
of the injury. Each athlete also emphasized the role of a support system during their injury. They discussed the importance of their spouses and the encouragement they received however, the support they received from their coaches was very different. For the athlete Paul, his coach wanted to see concrete evidence of his injury while Zach described feeling indebted to his coach for the support he gave him. Finally, the theme of professional sport transition refers to no longer being hockey players as their careers ended and losing their athlete identity which was exasperated by their injuries. This study provided one of the first published accounts regarding athletes’ experiences and perceptions of the severity and persistence of physical and psychological effects of sport-related concussions.

**Conclusion**

This review of literature reported on the extant research related to the management and return to play aspects of sport-related concussion; the signs and symptoms of sport-related concussion in relation to the physical, cognitive and emotional aspects of the injury; the different cognitive demands presented in sport based on level of sport participation; athletic identity and sports’ culture of risk as important contexts for understanding sport-related concussions; and common emotional and psychological responses to sport-related concussion including athletic identity and career transitions and termination. This review provides insight into our current understanding of these issues as well as the gaps in the literature and the need for further research. Specifically, given the prevalence and potential consequences of sport-related concussions, and the dearth of research exploring high school and collegiate athletes’ experiences of physical and psychological effects of sport-related concussion, research on this issue is warranted. This particular population matters because the stakes for these athletes are high. High school and college athletes who transition out of sport have their whole lives and careers ahead of them and as “amateur” athletes, organized/institutionalized youth sport has a responsibility for their health and well-being. These athletes also face unique academic and cognitive demands that concussions influence and these need to be better understood. Finally, the number of high school and college youth playing sport continues to increase and therefore more of these athletes are experiencing sport-related concussion. Thus, this research explored former high school/collegiate team sport athletes’ experiences of the physical and psychological effects of a sport-related concussion and the meanings they make of their concussion and its effects.
Chapter 3

Methods

Qualitative research, as defined by Shank (2006), is “a form of systematic empirical inquiry into meaning” (p. 4). By this he means that it is organized, planned, and public (i.e., occurring according to some agreed upon process). Further, it focuses/depends on the world of experience (not speculation). Finally, it is an inquiry into the significance, the meaning that people make, of a given social phenomenon. Meaning holds great importance in qualitative research, according to Shank (2006) because the path to truth always goes through meaning. For Shank and others informed by the qualitative paradigm, the world is full of meaning and we can only understand things to the degree we know what those things mean. Being grounded in a qualitative paradigm, the purpose of this research is to explore former team sport high school (club or interscholastic) and collegiate (club or intercollegiate) athletes’ experiences of the physical and psychological effects (i.e., cognitive and emotional) of a sport-related concussion.

The specific qualitative approach that informed this study is phenomenology. Researchers using this approach are interested in understanding the meaning of a particular social phenomenon from the perspective of those who have experience of that phenomenon (Schram, 2006). That is, the focus and purpose of phenomenology is to investigate the meanings or lived experiences of a social phenomenon from the perspective of a small group of people, the researcher seeks to convey the “essence” of the social phenomenon of interest, a meaning that is so fundamental to the experience that someone could read the phenomenological study and come away with the feeling, “I understand better what it is like to experience that” (Schram, 2006, p. 99). Additionally, an important aspect of phenomenology is the concept that our conscious awareness leads to our understanding of things “as they really are” and understanding that, phenomenologists are ultimately interested in seeing how people interpret their worlds, and in interpreting others’ interpretations (Shank, 2006).

A basic assumption of phenomenologists is that we can understand human behavior only in the context of relationships to things, people, events and situations. That is, understanding meaning requires embedding and not separating the parts from the whole, but exploring them in context. Further, understanding the everyday life of a group of people as a matter of coming to know how these people understand and act upon objects of experience. That is, one cannot develop an understanding of a social phenomenon apart from understanding people’s experience...
of or with that phenomenon. Additionally, language is the way we convey our experience of social phenomena and thus it is through language (in-depth phenomenological interviews) that a particular aspect of experience can be discovered. Finally, through dialogue and reflection it is possible to convey the essence of a particular concept or phenomenon as experienced by a number of individuals (Schram, 2006). These basic assumptions are important for understanding how phenomenological qualitative researchers will conduct their research (come to know and interpret the experiences of individuals).

In borrowing from phenomenology, it is important to be aware of the two orienting concepts of this approach. The first of those is \textit{epoche} which “refers to the ability to suspend, distance ourselves from, or \textit{bracket} our judgments and preconceptions about the nature and essence of experiences and events in the everyday world” (Schram, 2006, p. 99). Phenomenology’s focus is not on things, but rather on their \textit{meanings} so researchers must “bracket” their judgments about what they believe until there is a more certain description of what is occurring and being experienced by the individuals who have experience of the social phenomenon of interest. The second orienting concept is \textit{life-world} which refers to one’s ordinary conscious experience of everyday life and social action. This simply explains that people’s ways of knowing are locally situated and grounded in actual practices and experiences (Schram, 2006).

Hence, the nature of phenomenological questions is that such questions are targeted towards understanding the meaning of lived experience and the core or essence of a particular social phenomenon. The basic tenets of the phenomenological approach are the researcher enters the field of perception of study participants; explores how participants experience, live, and describe the phenomenon; and uses that information to understand and construct the meanings of study participants’ experiences (Schram, 2006).

**Recruitment and Sampling**

Mason (2002) states that sampling and selection in qualitative research are “principles and procedures used to identify, choose and gain access to relevant data sources from which you will generate data” (p. 120). Qualitative research focuses on arguments about how things work in a certain context, and does not seek to represent the full range of experiences. Thus, the sampling method is about how to focus, strategically and meaningfully, rather than how to represent a broader population (p. 136). Mason also describes two reasons for sampling: for practical and
resource-based reasons and to focus your study. The purpose of sampling is to ask the sample you are researching to provide data that you need.

This research conducted for this thesis used strategic sampling. As Mason (2002) states, the aim of strategic sampling is “to produce a relevant range of contexts or phenomena, which will enable you to make strategic and possibly cross-contextual comparisons and build a well-founded argument…the sample is designed to encapsulate a relevant range in relation to a wider universe but not to represent it directly” (p. 124). Shank (2011) discusses three sampling strategies that are used to decide whom and what you are going to study; these strategies are: (1) personal characteristic strategy (focusing on characteristics of person we recruit for the study), (2) pure logic strategy (convenience sampling, which is selecting cases based on convenience), and (3) theoretical sampling strategy (sampling with a purpose). This research used a combination of strategic or theoretical (specifically, purposive sampling) and convenience sampling. That is, high school and college students who have experience with the social phenomenon of interest (sport-related concussion) were recruited to participate in the study. More specifically, as the study sought to examine former team sport athletes’ experiences of the physical and psychological effects of sport-related concussion, selection criteria that had to be met for inclusion in the study were as follows:

(1) A former male and female high school (club or interscholastic) or collegiate (club or intercollegiate) team sport athlete
(2) Currently a college student
(3) 18 years of age or older
(4) Medically diagnosed (i.e., by a certified athletic trainer or medical doctor) with a concussion in the last 6 years that ended their participation in their sport at that level (e.g., because a doctor told them to stop playing or because of inability to or fearing return to play).

The final size of the sample was determined by what is called theory or data saturation (Sandelowski, 1995). This occurs when you have a picture of what is going on and can generate an appropriate explanation for it and when your data begin to stop telling you anything new about the social phenomenon under investigation. As Shank (2006) states, “saturation simply means that you have studied in a particular setting long enough so that you are now only finding things that you have already found” (p. 31). This occurred with the 9th interview.
**Qualitative Interviews**

To explore former team sport athletes’ experiences of the physical and psychological effects of a sport-related concussion, semi-structured qualitative interviews were conducted. Qualitative interviewing involves the interactional exchange of dialogue and is “a conversation with a purpose” (Mason, 2002, p. 84). The researcher has a set of starting points for discussion, or specific ‘stories’ they wish the interviewee to tell, but as the interview occurs, new questions may emerge from ‘the conversation’ and the researcher may add or replace questions (Shank, 2006). This type of interview is not as rigid as structured interviews that are considered “question-answer” type of interviews, but rather more of an interview with flexibility. That being said, the flexibility is not as great as in unstructured interviews and pre-determined guiding questions direct the interview process.

There are numerous reasons to choose qualitative interviews as the method of data generation (Mason, 2002). For the purposes of this research, there are two reasons this method was chosen. First, semi-structured qualitative interviews were chosen because the ontological position taken within this research assumes that people’s knowledge, perceptions, views, understandings, interpretations, experiences, and interactions are meaningful properties of social reality. Second, semi-structured qualitative interviews were chosen because the researcher believes that social explanations and arguments are grounded in depth, nuance, complexity, and roundedness of data, rather than in broad surveys of surface patterns. To say something about social processes, social change, and social meaning requires an understanding of depth and complexity in people’s situated and contextual accounts and experiences (Mason, 2002).

After deciding that conducting semi-structured phenomenological interviews was the right method for data generation in this research, critical questions were identified by the researcher and used to construct an interview guide that was six to eight questions in length. The Interview Guide developed for the proposed research (see Appendix A: Interview Guide) follows the suggestions made by Shank (2006) and Glesne (2011), including starting with what Spradley calls a *grand tour question*. This question asked the interviewees to describe when and how their sport-related concussion occurred and to reflect on their general experiences of this concussion. It turned out that all study participants had had multiple sport-related concussions and these were described in the interview, though the main focus was on their “career-ending” concussion. By asking such a question, it allows the interviewee to begin telling her/his story and provide
context for the conversation. Further, it is a question that can be relatively easily and readily answered, thus helping to establish a sense of comfort between the interviewer and interviewee.

Next, questions requiring more specification were asked (see Appendix A: Interview Guide). Throughout the interview probing questions such as “could you tell me more about that” or “what was that experience like for you” (Mason, 2002) were used to help me better understand how athletes make sense, the meanings they make, of their sport-related concussion and its physical and psychological effects. When it appeared that the interview was coming to an end, one concluding question was asked. The last question asked interviewees if they could tell me anything more about their experiences of sport-related concussion(s) that they did not yet have a chance to say that they thought would help me to understand their experiences better. This was important because with the semi-structured interview guide, interviewees may feel that they were not able to share pieces of their experience that were important to them.

**Procedures**

The research gained approval from the Institutional Review Board (IRB) at Miami University and then the primary investigator began recruitment. The researcher contacted instructors who teach courses in her home department, the Department of Kinesiology and Health (Appendix B: Instructor Contact Script) seeking their permission to come into their classes to speak to students about the study. Once approval was given, a date to come into the classroom was scheduled with the instructor. During the classroom visit, the researcher described her study to the class (see Appendix C: Classroom Recruitment Script), including the purpose and selection criteria. The primary investigator also provided her email address written on the board of classes and asked students to email her if they were interested in participating in the study. Additionally, the researcher asked if the students had any friends who fit the selection criteria and if so, to have those friends email the researcher. This technique described snowball sampling. If students emailed the primary researcher expressing interest in the study, they were emailed a recruitment form (see Appendix C: Classroom Recruitment Form) and asked to fill it out and return it. The recruitment form asked for student contact information and assessed students’ eligibility relative to the study selection criteria. Additional recruitment was done by posting a Recruitment Flyer (Appendix D) in various locations on campus including Phillips Hall and Chestnut Field House.
Participants who completed the Recruitment Form (see Appendix E) and returned it to me were emailed (see Appendix F: Initial Contact Email) about their potential involvement in the study and again in the Follow-Up Email (Appendix G). At this point, the date, time and place where the interview will take place were determined. The Informed Consent Form (Appendix H) was attached to the Initial Contact Email (Appendix F) for the participant to read before agreeing to participate. This form was again included in the Follow-Up Email (Appendix G) and the Day Before Interview Email (Appendix I).

When each participant arrived at the designated interview place, the researcher, by way of the Interview: Introductory Script (Appendix J) greeted the participant, described the process of the interview, and asked if there were any questions. Once the researcher reviewed all the procedures and details of the study, the study participant was asked to sign the Informed Consent Form (Appendix H). Only those who signed the informed consent were allowed to participate in the interview. Participants were reminded of the voluntary nature of the research and that declining to participate would involve no penalty or loss of benefits to which the subject is otherwise entitled. Following receipt of their written consent to participate in the research, participants were given the Background Information Sheet (Appendix K) to complete. This gave the researcher some basic information about the study participant from which to start the interview. At this point, the audio-recording device (a computer) was turned on.

Two participants’ interviews were completed over Facetime. This allowed the interviewer and interviewees who were not in the same geographical location to still communicate “face-to-face”. Released in 2003, Facetime is a software application that enables communication by video using webcam on Apple Inc. products. Facetime has a few significant advantages for qualitative interviewing (Seitz, 2016). Using this method, the researcher saved travel time and money and opened more possibilities in terms of geographic access to participants. Additionally, conducting interviews over Facetime can be more comfortable because they occur in one’s own private space. For interviews conducted over Facetime, participants were similarly emailed an Informed Consent Form (Appendix H) that was attached to the Initial Contact Email (Appendix F), the Follow-Up Email (Appendix G) and the Day Before Interview Email (Appendix I). Participants were asked to review this before the interview and were told that assent would be given via Facetime. Additionally, when establishing a date and time for the interview, participants were asked to pick a quiet place in which to talk.
Participants were also emailed the Background Information Sheet (Appendix K) to complete prior to the interview.

When each participant connected via Facetime, the researcher greeted the participant using the Interview Introductory Script as a guide), described the process of the interview, and asked if there were any questions. At this point, the audio-recording device (a computer) was turned on. The researcher then asked if the participant had received and read the emailed copy of the Informed Consent Form (Appendix H). After participants responded yes, the researcher again reviewed all the procedures and details of the study and asked if participants had any questions. At this point, interviewees were asked to assent to the Informed Consent Form (Appendix H). Only those who assented to the informed consent were allowed to participate in the interview. Participants were reminded of the voluntary nature of the research and that declining to participate would involve no penalty or loss of benefits to which the subject is otherwise entitled. Interviews conducted over Facetime then followed a similar process to interviews conducted in person.

The Interview Guide that was created for use in this research (Appendix A: Interview Guide) was used by the researcher to guide the interview as described previously. This Guide served as a guide only – that is, interviews were conducted as “a conversation with a purpose” (Mason, 2002). The interviews followed a “natural course” and probing and follow-up questions were utilized. Interview Guide questions were developed to facilitate study participants’ telling of her/his “story” of physical and psychological effects of sport-related concussion.

After all questions from the Interview Guide were addressed, the researcher asked the participant a concluding question: “Can you tell me anything else about your experiences that you haven’t had a chance to say that you think will help me gain a better understanding of your experiences of a sport-related concussion?” Following this, the researcher used an Interview: Concluding Script (Appendix L) to direct the ending of the interview. Once each participant left the interview space or participants disconnected from Facetime, the researcher filled out a summary form (Appendix M: Interview Summary Form), reflecting on her initial feelings, ideas, and observations from the interview. Interviews lasted between 30 minutes and an hour and 24 minutes, but went as long as needed, as it is recommended to allow interviews to have their own natural length (Shank, 2006).

**Methods that Ensured Quality in the Study**
Research validity in qualitative research is spoken in terms of research that is plausible, credible, trustworthy, and therefore, defensible (Johnson, 1997). When undertaking qualitative research there are a few strategies that can be employed to ensure a high-quality study. Johnson highlights several different issues with validity in qualitative research. Presented here are the ways I sought to ensure high quality in this study.

First, in any type of research, one must be aware of researcher bias. Researcher bias is described as researchers allowing their assumptions and beliefs about the social phenomenon of interest to determine what they “hear” and “find”. Researcher bias tends to occur from selective observation and selective recording of information. One way the study addressed researcher bias was by employing the technique of reflexivity. Reflexivity requires that the researcher actively engage in critical self-reflection about his or her assumptions and beliefs about the social phenomenon of interest by recognizing and acknowledging what they are (Johnson, 1997). By doing this, the researcher becomes more self-aware and can bracket her or his biases. The current researcher has done this by writing a preliminary sense of problem (see Appendix N: Preliminary Sense of Problem) and employed analytic memos during the process of the research (Schram, 2006).

The issue of descriptive validity is related to the factual accuracy of the account reported by the researcher (Johnson, 1997). To help ensure descriptive validity, each interview was audio-recorded and transcribed verbatim. In presenting results, in-vivo quotes are used as evidence of the factual accuracy of what interviewees said (Cresswell, 2013).

Finally, researcher triangulation was used to enhance interpretive validity (Johnson, 1997). According to Johnson, interpretive validity refers to “accurately portraying the meaning attached to participants to what is being studied by the researcher” (p. 162). The researcher, to the best of their ability, works to ensure that the research participants’ viewpoints, thoughts, feelings, intentions, and experiences are accurately understood and portrayed in the research. One way to do this is through triangulation which requires a researcher to cross-check her/his information, interpretations, and conclusions with another researcher. The researcher used this strategy throughout the data generation and analysis process by sharing her recruitment and sampling experiences and interview impressions, data, and interpretations with her primary advisor for feedback and analysis.

Analysis
Per Creswell (2013), qualitative research data analysis entails preparing and organizing the data for analysis, reducing the data into themes through coding and finally, representing the data in figures, tables and/or a discussion. More specifically, this process can be broken down into 6 steps that were followed in the analysis process of this research. The first step is to transcribe all interviews verbatim. The second and third steps involve starting with the verbatim transcriptions, reviewing the “Preliminary Sense of Problem” memo (Appendix N) and having the Central Research Question(s) (Appendix O) typed out in front of you so as to be clear the basis for your analysis. The fourth step includes reading, re-reading, and re-reading again the transcripts. As noted by Shank (2006), analysis in qualitative data requires you to “have a conversation with” the data to “engage with” the data. The fifth step in the process of analyzing qualitative interviews involves classifying the data. To do this, one must mark/bracket everything and anything in each interview transcription that in any way answers the Central Research Question. Once marked, these become known as “slices” of data. Then, one must “name” each slice of data by asking what is the “meaning” of that slice of data. Once it is named/coded it is known as a “meaning unit”. These meaning units get their names via in-vivo codes. According to Creswell (2013), in-vivo codes use words taken directly from the interviewees’ words. As slices of data become meaning units via these in-vivo codes, relationships and themes start to emerge. As Glesne (2011) states, a result of coding is that a “framework of relational categories” (p.195) begin to emerge and as these codes clump together into themes, something that you may not have thought would fit together does. That is, slices or data or themes that emerge from the data may be grouped together into a larger theme and thereby become sub-themes. After this stage, the development of a “conceptual map” depicting the relationship(s) among the themes is undertaken and presented in text and figure/picture format (Creswell, 2013). The figure/picture format helps to display the overall “big picture” of the results (Glesne, 2011).

As noted, Creswell’s process of analysis just described was followed in this study. In the next chapter, the of this analysis are reported. Both the “big picture” of the results, as well as the specific themes and/or sub-themes (and the verbatim quotes that provide evidence of them) are presented.
Chapter 4

Results

This study asked the question, “What are former high school and collegiate team sport athletes’ experiences of sport-related concussion and the physical and psychological effects of such concussion?” Analysis of the data generated via the interviews that explored this question resulted in a number of themes and sub-themes. Following a description of the study participants, a brief overview of the conceptual map (see Figure 1) that illustrates the relationship among the themes and sub-themes is discussed. Then each theme and its sub-themes, if applicable, are explained in detail, with evidence provided for each. Finally, the conceptual map will be discussed further and detail how the themes and sub-themes answer the research question.

Description of Study Participants

As previously noted, participants were former team sport athletes who sustained a medically diagnosed concussion in the last 6 years that resulted in the ending of their participation in sport at the level they played. Seven participant’s sport participation ended during the season in which they sustained their concussion. One participant’s sport participation ended one year and another participant’s participation ended two years after their last concussion. A total of nine individuals participated in the study. There were five females and four males with ages ranging from 18 to 24 (M=20.7 years). The participants identified a wide variety of sport which they competed in as well as the highest level of participation. The number of diagnosed and undiagnosed concussions varied from participant to participant as did when participation stopped and who ultimately made the decision to end their sport involvement (see Tables 1 and 2: Description of Study Participants, Description of Study Participants’ Concussions). In addition to Tables 1 and 2, a further description of each study participant is also provided.

Interviewee JW1: JW1 is a 21-year old male. He reported his total years of sport participation as 11, competing in football, basketball, lacrosse and track and field. Football was the team sport he identified for this study, which was his primary sport, and his position was middle linebacker/running back. He reported sustaining 5 sport-related concussions that were diagnosed and an unknown amount of undiagnosed sport-related concussions. He was a non-scholarship athlete who was a starter and his highest level played was Division III College. He
stopped participating in sport his freshman year of college and that decision was made by his doctor.

Interviewee CS2: CS2 is a 21-year old male. He reported his total years of participation as 15, competing in hockey and cross-country. Hockey was the team sport he identified for this study, which was his primary sport. He reported sustaining 3 sport-related concussions that were diagnosed and an unknown amount of undiagnosed sport-related concussions. He was a non-scholarship athlete who was a starter and his highest level played was Club College. He stopped participating in sport his freshman year of college and that decision was made by him.

Interviewee GB3: GB3 is a 22-year old male. He reported his total years of sport participation as 18, competing in football, swimming, baseball and cross country. Football was the team sport he identified for this study, which was his primary sport, and his position was receiver/defensive back. He reported sustaining 3 sport-related concussions that were diagnosed and 5 undiagnosed sport-related concussions. He was a starter and his highest level played was Varsity High School. He stopped participating in sport his junior year of high school and that decision was made by his parents and his doctor.

Interviewee HY4: HY4 self-identified as a 21-year old female. She reported her total years of sport participation as 17, competing in field hockey, volleyball and basketball. Field Hockey was the team sport she identified for this study, which was her primary sport, and her position was defense. She reported sustaining 3 sport-related concussions that were diagnosed, 2 other diagnosed concussions that were not sport-related and 0 undiagnosed sport-related concussions. She was a scholarship athlete who was not a starter and her highest level played was Division II College. She stopped participating in sport her freshman year of college and that decision was made by her.

Interviewee GM5: GM5 is a 22-year old female. She reported her total years of sport participation as 13, competing in soccer. Soccer was the team sport she identified for this study, which was her primary sport, and her position was center midfield/forward. She reported sustaining 5 sport-related concussions that were diagnosed and 6 undiagnosed sport-related concussions. She was a scholarship athlete who was a starter and her highest level played was Division II College. She stopped participating in sport her sophomore year of college and that decision was made by her doctor.
### Table 1
**Description of Study Participants**

<table>
<thead>
<tr>
<th>Interviewee</th>
<th>Age</th>
<th>Sex</th>
<th>YTSP</th>
<th>Sport</th>
<th>Position</th>
<th>Scholarship/No-Scholarship Athlete</th>
<th>Highest Level</th>
<th>Starter/Not Starter</th>
</tr>
</thead>
<tbody>
<tr>
<td>JW1</td>
<td>21</td>
<td>M</td>
<td>11</td>
<td>Football</td>
<td>Middle Linebacker/Running Back</td>
<td>Non-Scholarship</td>
<td>DIII</td>
<td>Starter</td>
</tr>
<tr>
<td>CS2</td>
<td>21</td>
<td>M</td>
<td>15</td>
<td>Hockey</td>
<td>N/A</td>
<td>Club College</td>
<td>Starter</td>
<td></td>
</tr>
<tr>
<td>GB3</td>
<td>22</td>
<td>M</td>
<td>18</td>
<td>Football</td>
<td>Receiver/Defensive Back</td>
<td>Varsity H.S.</td>
<td>Starter</td>
<td></td>
</tr>
<tr>
<td>HY4</td>
<td>21</td>
<td>F</td>
<td>17</td>
<td>Field hockey</td>
<td>Defense</td>
<td>Scholarship</td>
<td>DII</td>
<td>Not Starter</td>
</tr>
<tr>
<td>GM5</td>
<td>22</td>
<td>F</td>
<td>13</td>
<td>Soccer</td>
<td>Center Midfield/Forward</td>
<td>Scholarship</td>
<td>DII</td>
<td>Starter</td>
</tr>
<tr>
<td>NH6</td>
<td>20</td>
<td>F</td>
<td>14</td>
<td>Rugby</td>
<td>Hooker</td>
<td>Non-Scholarship</td>
<td>Club College</td>
<td>Starter</td>
</tr>
<tr>
<td>ER7</td>
<td>18</td>
<td>F</td>
<td>15</td>
<td>Soccer</td>
<td>Goalkeeper</td>
<td>Non-Scholarship</td>
<td>DI</td>
<td>Not Starter</td>
</tr>
<tr>
<td>SM8</td>
<td>24</td>
<td>F</td>
<td>12</td>
<td>Basketball</td>
<td>Forward/Center</td>
<td>Non-Scholarship</td>
<td>DII</td>
<td>Not Starter</td>
</tr>
<tr>
<td>ES9</td>
<td>18</td>
<td>F</td>
<td>14</td>
<td>Soccer</td>
<td>Goalkeeper (Midfield after Concussion)</td>
<td>N/A</td>
<td>Varsity H.S.</td>
<td>Stater – Goalkeeper/Not Starter – Midfield</td>
</tr>
<tr>
<td>Interviewee</td>
<td>Diagnosed Concussions</td>
<td>Undiagnosed Concussions</td>
<td>Stopped Participation</td>
<td>Decision-Maker to end Sport Participation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------</td>
<td>------------------------</td>
<td>--------------------------</td>
<td>-----------------------</td>
<td>------------------------------------------</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>JW1</td>
<td>5</td>
<td>Unknown</td>
<td>Freshman Year of College</td>
<td>Doctor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CS2</td>
<td>3</td>
<td>Unknown</td>
<td>Freshman Year of College</td>
<td>Athlete</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GB3</td>
<td>3</td>
<td>5</td>
<td>Junior Year of High School</td>
<td>Doctor and Parents</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HY4</td>
<td>5</td>
<td>0</td>
<td>Freshman Year of College</td>
<td>Athlete</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GM5</td>
<td>5</td>
<td>6</td>
<td>Sophomore Year of College</td>
<td>Doctor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NH6</td>
<td>6</td>
<td>2</td>
<td>Freshman Year of College</td>
<td>Athlete</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ER7</td>
<td>3</td>
<td>3</td>
<td>Freshman Year of College</td>
<td>Doctor/ Athlete/ Parents</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SM8</td>
<td>7</td>
<td>Unknown</td>
<td>Sophomore Year of College</td>
<td>Athletic Trainer</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ES9</td>
<td>5</td>
<td>~5</td>
<td>Sophomore Year of High School (Goalkeeper)/Senior Year of high School (Midfield)</td>
<td>Doctor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Interviewee NH6: NH6 is a 20-year old male. He reported his total years of sport participation as 14, competing in rugby, football, baseball and basketball. Rugby was the team sport he identified for this study, which was his primary sport, and his position was hooker. He reported sustaining 6 sport-related concussions that were diagnosed and 2 undiagnosed sport-related concussions. He was a non-scholarship athlete who was a starter and his highest level played was Club College. He stopped participating in sport his freshman year of college and that decision was made by him.

Interviewee ER7: ER7 is an 18-year old female. She reported her total years of sport participation as 15, competing in soccer. Soccer was the team sport she identified for this study, which was her primary sport, and her position was goalkeeper. She reported sustaining 3 sport-related concussions that were diagnosed and 3 undiagnosed sport-related concussions. She was a non-scholarship athlete who was not a starter and her highest level played was Division I College. She stopped participating in sport her freshman year of college and that decision was made by her doctor, herself and her parents.

Interviewee SM8: SM8 is a 24-year old female. She reported her total years of sport participation as 12, competing in basketball. Basketball was the team sport she identified for this study, which was her primary sport, and her position was forward/center. She reported sustaining 7 sport-related concussions that were diagnosed and an unknown amount of undiagnosed sport-related concussions. She was a non-scholarship athlete who was not a starter and her highest level played was Division III College. She stopped participating in sport her sophomore year of college and that decision was made by her athletic trainer.

Interviewee ES9: ES9 is an 18-year old female. She reported her total years of sport participation as 14, competing in soccer. Soccer was the team sport she identified for this study, which was her primary sport, and her position was goalkeeper prior to her last concussion and then changed her position to midfield. She indicated sustaining 5 sport-related concussions that were diagnosed and ~5 undiagnosed sport-related concussions. She was a starter when she was a goalkeeper and not a starter when playing midfield and her highest level played was Varsity High School. She stopped participating as a goalkeeper her sophomore year of high school and stopped participating in sport her senior year of high school and that decision to transition from goalkeeper to field player was made by her doctor. Prior to her last concussion, she felt that she could have played in college, but after her change in position, she felt that she was not good
enough to continue in college and made the decision to end her participation at the end of her high school season.

**Explanation and Evidence of Themes**

Based on the analysis of the qualitative interview data, six themes were identified that describe study participants’ experiences of sport-related concussion and the physical and psychological effects of sport-related concussion. A conceptual map illustrating the relationships among the themes was also constructed (see Figure 1). The theme *Concussion vs. Injury* refers to study participants’ perception that a concussion is a type of injury (e.g., like an ACL injury), but also unique or different from a physical sport-related injury (i.e., it is not visible whereas an ACL injury is). That is, participants indicated that a concussion was more than simply being injured because others could not necessarily see the injury - and because they were unclear if their symptoms were due to the concussion per se and/or because of the feelings associated with a sport-ending sport participation. This was an overarching experience of concussion that influenced the other themes/meanings reported by all participants and evidence of it is found in many of the quotations provided for the other 5 themes. Hence, in the Conceptual Map it is depicted as surrounding the 5 other themes and should be thought of as the context in which the meanings of a sport-related concussion are embedded for these study participants. The other five themes were: *Variability in Experience, Multiple Concussions, Implications Beyond Sport, Transition, and Invisible Injury*. Each of these themes had multiple sub-themes and two themes, *Variability in Experience* and *Transition*, had sub-themes that had sub-themes. Each theme and sub-theme is described next along with evidence of each.
**Theme: Variability in Experience.** This theme refers to the variability in experiences of a sport-related concussion. The 5 sub-themes that comprise this theme describe how while sharing experiences of a sport-related concussion, at the same time each participant reported a unique experience concerning the *Symptoms* experienced, the *Recovery Process*, how *Social Support/Resources* responded to her/his injury and transition out of sport, *Timing* of the injury, and *Who Made the Decision* to end her/his sporting participation.

**Sub-theme: Symptoms.** This study was designed to explore the physical and psychological symptoms of sport-related concussion so perhaps then not surprisingly, for study participants sport-related concussion meant having symptoms. However, symptoms were not uniform. Rather a wide variety of physical, cognitive, and emotional symptoms were experienced - as was (in one case), having no symptoms. Specifically, CS2 was knocked unconscious after his final concussion and had this to say about his experience of concussion: “…the weird thing is that for such a bad concussion I didn’t have any symptoms.” For the rest of the study participants, some symptoms were common, some were experienced by only a select few, and most reported experiencing a *variety* of symptoms.
Physical symptoms were typically headaches, sensitivity to light and sound, and fatigue. All but two participants experienced headaches to some degree after sustaining their concussion and as noted by ER7 and SM8 below, headaches were a symptom that lasted and hard to get rid of.

GM5: …in the beginning it was like really bad headaches…eventually it becomes just the headaches turn into a dull headache that you just bear with cause it’s I don’t know. It usually just turns into a dull headache and then it slowly simmers away but um for the most part it was just there for like the whole time.

ER7: I had chronic headache issues…occasionally they will get really bad. It kind of depends, I think dependent on the day, dependent on my stress level, other stuff going on I’ll have like a low-grade back of the head headache for half the day or whatever but then I’ll get low-grade migraines sometimes for like an hour or two.

SM8: The main symptom that seemed like forever like to get rid of was headaches. I would have headaches you know for most of the day everyday which made it more difficult to focus on things or pay attention to things for a long time.

ES9: I would talk to somebody and I could probably talk or be social for an hour and then my headache hurt so bad.

Sensitivity to light and sound were also physical symptoms that participants described experiencing. ES9 stated: “light and sound were big ones for me.”

In describing what it was like to experience sensitivity to light, JW1 had this to say:

JW1: …if you walk outside, if you’re in a dark room and then someone turns the lights on all of a sudden you get that feeling of like ah, you know you squint your eyes and just sort of like feels like sort of sharp on your eyes and things like that but that was the feeling always whenever I was walking around outside in the sun. There was never that you know getting used to the light kind of thing. I was kind of always feeling like I should be in a dark room somewhere you know sleeping so that’s how that felt for the most part.

A few participants also described sport-related concussion as meaning sensitivity to sound:

GB3: I couldn’t use ear buds for a long time like I couldn’t listen to my music which is funny cause I went almost two months without listening to any music so I got behind on all the new songs and everything which was kind of funny.

SM8: If I was watching TV I would have to mute the commercials and basically only be able to watch the actual show and then I would have to turn my cell phone to complete silence because even just hearing the vibrate would be irritating.
ES9: When it’s a ton of people talking at once like a full gym at a basketball game or something, that’s when I start to get a really bad headache because there’s not one thing I can focus on. It’s just so many different noises hitting me at once and it’s like a constant never ending loud noises that gets me a lot.

Another physical symptom that participants dealt with was fatigue and needing more sleep. As described by JW1: “I learned right off the bat was that sleep was vitally important.” This statement reflects the fatigue that participants felt after sustaining a concussion and how important they believed it was to sleep to aid recovery. When describing fatigue, participants noted that initially all they really did was sleep:

GB3: I was very fatigued like I would sleep 16+ hours a day…I would walk from my room, down the stairs to the couch and I would sleep and then I would get up and move into the kitchen table, eat, go back to the couch sleep and then go from the couch up to my room again and sleep and it was just that little movement like those hundred steps a day just killed me.

ES9: I stayed home, laid on the couch. I probably napped, all I could do was sleep…I would sleep for 3 hours, wake-up for an hour and half-two hours, go back to sleep for three hours.

Physical symptoms were not the only symptoms that participants experienced. Cognitive symptoms were also discussed and these symptoms were focus and memory issues. Concerning focus, GM5 said: “…getting a lot like harder and harder to study and focus…I couldn’t focus.” This participant further described what it was like in the classroom dealing with those focus issues:

It didn’t work trying to pay attention. A lot of times depending on the subjects, I’d either zone out and not know and come back in and pick up a few things that they were saying or I’d write out what they’re saying but not really grasping it. It doesn’t process and even when I go back to study it I’m like I don’t remember any of this (laughs). Either that or just whenever I try to focus I get a really bad headache for the rest of the day. So, I have to pick and choose the classes that I’m gonna focus on or I’m gonna zone out.

Similar to GM5, another participant also described the focus issues that she experienced in the classroom:

ES9: …focus was my hardest one. If I was given something like a paper with a ton of writing on it, I couldn’t just sit there and read it. My English class, we were actually reading a book at the time and I was like I can’t read this book like I can’t sit down and read 20 pages at a time. It just wasn’t a thing. I just couldn’t focus that long, my head would start to hurt especially if it was like small text.
Memory issues were a common cognitive symptom described by participants. The context in which those memory issues occurred though varied by participant. For JW1, it occurred not long after his concussion when talking with his parents and helped him realize that he did in fact have a concussion:

[My parents] asked me things like you know how’s your first couple weeks of school going, you know, we have some stuff to deliver to your dorm what’s the address to your room and I couldn’t even think of my dorm number.

For GB3, memory issues were experienced in the context of school:

Memory was hard like memorization of key terms and my mom would ask me what I learned in school today and I would forget and she would get pretty mad that I wasn’t paying attention but I mean I was paying attention. It was there, it was just it didn’t register so memory was really hard.

Memory issues were a contributor in one athlete’s decision to end her sport-participation:

ER7: The main issue with this last one which was kind of a step back to analyze what I was doing was I was having a lot of short-term memory issues so my original test scores after this - I was in the 90th percentile for all like concussions testing and memory stuff and I dropped below 1% after I got that one so it was kind of, if you’re really having these memory issues you need to look at the long-term because you don’t need to have early onset dementia by age 30.

ER7 also said:

Say I was having a conversation with somebody I knew, we would be talking about whatever and then it would come up at like 9pm or something and they’d be like don’t you remember? I would ask the same question again and they’d be like oh, you just asked me that question and I would have no idea what the answer was. It was just one of those kind of I would catch myself in these situations and say why do I not recall something so specific?

Finally, most participants reported emotional/psychological symptoms as part of their experience of sport-related concussion. For many participants, these symptoms were especially complex because they were unsure if what they were experiencing was due to the concussion, due to being injured and having to transition out of sport, or a combination of the two. The emotional/psychological symptoms ranged from irritability and frustration to anxiety and depression. Irritability was the emotion that was mentioned most often when participants were asked if they experienced any emotion or mood changes as a consequence of their sport-related concussion.
GB3: When I was concussed I was snippy. If someone would say something I didn’t wanna hear I wouldn’t go off on them, but you could just tell I would get annoyed very, very quick. I remember when I was concussed my grades dropped a little bit and my mom said something about it and she asked me why they were dropping and I remember just it’s the only time I’ve ever snapped and been disrespectful to my mom and I felt so bad afterwards cause I was like oh my god what did I just but it was like just (snaps) quick not even thinking about my actions just going full rage and I was irritable.

HY4: I was just kinda quick to anger like if I was trying to explain something and somebody wasn’t understanding it and I would just be like why don’t you get it…I was just really snappy and just kind of annoyed with everything…but that didn’t last too long. I feel like it could have just been because I didn’t feel like myself 100% and I wasn’t able to play so I was annoyed about that. But once I was allowed to participate again, it kind of went away so it was definitely a part of it.

ER7: I think it was a lot of those who weren’t close to me that heard what had happened or something and out of genuine concern reached out or said this is what I heard happened like what are you gonna do? I felt like I was being interrogated at the time. They were just showing genuine concern for stuff but I think I had the…urge to be kind of snippy about it and kind of just say like you know, it’s none of your business, whatever like I think me being angry with myself to be in that situation and all of it ending was kind of a weird thing to deal with so I think when I had to talk about it, I didn’t wanna talk about it.

ES9: I was very irritable. I would snap at my mom in an instant when she was trying to help me. I was just like part of me was pissed about not being able to play in the goal anymore so that was part of my like about everything but also just my head hurt, I could do nothing to fix it so I was just really mean to people.

For two participants, sport-related concussion meant anxiety, as they explained:

GM5: When I was in college I started getting anxiety attacks too out of nowhere because I usually don’t have that issue but I started getting anxiety attacks. I think it was a contributing factor but I also had…like a lot of issues with my family and I guess learning more about myself and becoming more aware of things…is what followed like it was all just adding up and then I look back at it, I wasn’t really in a good place and I just started having anxiety attacks.

NH6: I definitely feel like I might have a little bit anxiety when it comes to certain things like giving presentations especially, but I’ve been working on that...I wouldn’t say I really had anxiety before the concussions started. When I’m disorganized I freak out a lot. I need to have a set schedule. I need to see what’s going on beforehand. I’m not like I can’t just do stuff instantly. I’m pretty flexible and I’m pretty laid back, it’s just some like- like what would be an example of something that would just like throw me off? Like if I had set plans or something like that and then something happens and they change completely, some- it just gets ruined that’s like- that definitely ticks me off.
Further, for some participants sport-related concussion meant depression:

GB3: I think junior year was probably the saddest year that I’ve ever experienced. I remember the sport psychologist said I displayed signs of depression and my parents kind of played it off cause they didn’t think that they had a depressed kid but even I look back on it like was I really depressed or was I just but hurt that I couldn’t play football anymore and I think it was just being hit by that shell and taking a really long-time to accept it kind of it was just a lot of frustration. I wouldn’t say I was depressed but I was definitely really sad. I had friends come up to me randomly like say hey you look so sad right now and it wouldn’t be just like me sitting there with nothing to but yeah, I’d say cognitively I was just a little more sad cause it was hard to accept.

JW1: I had a lack of motivation slash depression kind of thing that definitely lingered for a while. I’m sure a lot of it had to do with the concussion but a lot of it also had to do with just having the concussion and how I almost felt like you know why is this happening again? It doesn’t even seem like it’s that bad. Why am I having to go to all of these doctor’s appointments for it? Why is my head hurting all the time? Just basically asking myself why, why, why over and over again. Kind of feeling a little self-pity like why me kind of things so that was kind of tough too. There were certainly a lot of periods where that was hard to deal with it and it made it…especially in the beginning, made it even worse or even harder to do different tasks because I would just put it off because I kept just feeling worse about myself. I can’t do anything right now. I’m just gonna keep putting it off and off and then if I keep doing it then I’ll just keep making my concussion worse but if I don’t do my school work then my grades are gonna get worse and then it just kept going back and forth and I didn’t really know what to do. That’s when I started getting a little more of the depression sort of lack of motivation symptoms just as it kept lingering on after three weeks, four weeks, five weeks I was like alright this needs to be done why am I still going to the doctor? Why am I still dealing with this?

Despite struggling the consequences of depression and the depression it led to, later in the interview, JW1 indicated that he believed his experience with concussion-related depression actually helped him deal with other stressful moments in a more positive manner:

I’ve experienced times of emotional stress, family issues transferring to [school], just a lot of big changes going on that I think could have possibly been detrimental and I could have dealt with the wrong way like I did the first time but I think because of the experience I had before, I was able to deal with it in a more positive way and I was almost more experienced in knowing how to deal with it I guess. But I would say feelings have come up again but I just was able to deal with them a lot differently than I did the first time.

It is also important to note that participants also described symptoms becoming worse because of other symptoms that they experienced. Some examples of this in interviews were:

GM5: Just whenever I try to focus I get a really bad headache for the rest of the day.

SM8: I think that a lot of those cognitive symptoms came as a result from the headaches.
ES9: I just couldn’t focus that long, my head would start to hurt.

Sub-theme: Recovery Process. Another sub-theme comprising the theme Variability in Experience is Recovery Process. Participants discussed at length the recovery process of their injury and the variety of treatment techniques as well as medications they tried to alleviate the symptoms they were experiencing:

GB3: I had a sport psychologist and a neurologist and they were my two doctors. I would go in to the psychologist, I think the psychologist was once a week and the neurologist was one to two times a week it just depended. I had the psychologist for a month like he didn’t stay around for every long cause I kind of didn’t really open up to him so it was just really the neurologist and he did a bunch of skill drills. He would just ask a lot of questions, use the 0-10 chart a lot which was really annoying. I continued playing the skill drill games for a year afterwards cause he was like it’s good just download the app, just play it once or twice a week and keep solving puzzles.

HY4: Basically, just resting. [My athletic] trainer wanted me to do physical activity which I was kinda surprised by like cycling, spinning stuff like that and he said limit my time on computers and phones. There wasn’t many restrictions I felt like except I couldn’t practice and he said absolutely no drinking.

GM5: The problem is the part where your brain has to heal so that requires you basically not to do anything so we did the best we can. I was put on disabilities for school so I would have like note takers and extended test times. I was given medication to help with focusing and sleeping and for my nausea cause I had a lot of nausea off of those. I think so I just had those three medications and he recommended that to the best I can to rest my brain and no drinking alcohol. I guess just not watching too much TV or texting cause with the bright screen and stuff. I went to like a neurologist where they took tests to make sure I didn’t have any severe permanent damage with any functioning and from then the neurologist recommended vestibular therapy. I remember going into vestibular therapy for the first time and I hated it so I didn’t do it anymore cause you would comeback out with twice the headache. I did some neck exercises and back strengthening exercises to help keep the head there. I saw a psychologist and they just wanted to do that because I guess with the amount I’ve had in such a short time, they just wanted to makesure I was able to sort things out up there. I went to the one at school and it didn’t go that well. She just kinda jumped the gun so it pushed me away so it was first and last time going to a psychologist.

NH6: I always did the cocoon procedure where I’ll just lay in a room for two days and just try to like no light, no sounds anything just keep my brain as at rest as it could possibly be…since I stopped playing rugby, I got diagnosed with ADHD and since then I’ve been taking my [medication] so I almost feel like I kinda need that to function at this point. I feel like it almost makes me feel normal in a way.
SM8: My sophomore year I met [a neurologist] a couple times and they basically just would treat mostly the headache because the neurological screening would check out fine, reflexes and stuff like that. So, I’ve been on a couple different medications for headaches and they don’t really make a difference. I don’t know, he didn’t really say a lot like we didn’t really talk about anything I felt like that was concussion related. It seemed like everything was always very much headache focused and I didn’t necessarily feel like that was what the issue was.

In discussing their treatment experiences, participants also discussed the length of time it took to recover from their injury and their frustration associated with not getting better:

JW1: I kept I guess trying to come back. I kept taking the baseline concussion test, you know after whatever the time was I would take it, I didn’t pass it and then I would wait again for the recovery, take it, not pass it and that went along through almost the entire season until they finally decided to redshirt me so then I just sat the rest of the year.

GM5: [My doctor] was asking me are you ready to play and then I was like I think I’m about ready to play contact but I probably need maybe a month and then I’ll be a lot better. I think based off of that it was just it shouldn’t be taking a whole year to recover from a concussion…I’d get really frustrated because a lot of it was I would have this concussion, I’d take a while to get over and then I had to start getting in shape for soccer again. I’d get in shape and then I’d get there and I’d start playing and right as I was getting my groove back I’d get hit again and have to start over.

ER7: I would go to testing every week so I did initial ones and then I had to go back to the concussion center and then do more tests to see if I could be cleared and then I wasn’t cleared I would go back again.

GM5 also discussed the relationship between the recovery process taking time and academics. Her recovery from her final concussion took almost an entire year and felt that it took so long because she was not able to rest her brain completely due to school:

I think the reason why it took longer for me to heal was because of the fact that I couldn’t take a break from my studies so while I wasn’t playing soccer, I wasn’t really resting my brain.

For ES9, part of her recovery process involved going through the return-to-play protocol as she made the transition from goalkeeper to midfielder. She described how the protocol took about a month:

As far as soccer it was a month until I started my return-to-play. It started with just little things like balancing on one foot or jogging one lap around our gym. It escalated all the way to jogging around our track around the top of our gym for 25 minutes and doing stairs and a lot of different jumping exercises, quick movements. It was hard, very hard. I was out of shape and just trying to get my mind so it didn’t hurt so my head did not hurt
doing that. I had to take it really slow at the beginning because it was hurting a ton but once I got to the point where I was like oh this doesn’t hurt anymore I could fly though the ending part really fast.

One important aspect of the recovery process for concussions that study participants discussed is feeling fatigued and getting enough rest (as reported above). Two participants reported that a consequence of this meaning of concussion is feeling bored or that everyday life is monotonous:

ES9: I was very bored and anxious to be back with people but also in a lot of pain and I couldn’t do anything. Luckily, I really like Harry Potter and I know the movies if I close my eyes I can still hear and know everything that’s going on so I watched a lot or well I listened to a lot of Harry Potter and I just laid on the couch with my eyes covered and listened to it to keep my mind somewhat preoccupied so I wasn’t in constant boredom.

GB3: It was just very monotonous I would say. A day at school I would walk in, how are you like fine. It wasn’t walking and talking to my buddies like what happened last night or just normal conversations wouldn’t happen. It was everyone being worried about me and I hated that. It was just monotonous and that’s kind of what made me irritable I think, too.

Sub-theme: Social Support/Resources. This sub-theme describes the role of others in interviewees’ lives as they recovered from their concussion and made their transition out of sport. Participants described the relationships with their parents and other family members, coaches, athletic trainers and professors/teachers. Interviews with study participants indicated that they believed that relationships played a vital role in recovery whether at home, on the field or in the classroom as well as the decision to transition out of sport. Some of those interactions were positive while others were not.

When asked about the role of their family members in their recovery process and transition out of sport (i.e., were they helpful and/or not helpful?), participants primarily noted the support that they provided.

ER7: I’m extremely close with my family. I’m really fortunate to have everybody that I do. They were phenomenal throughout the whole process, very supportive, very much whatever you need we will figure it out. I think especially during that period they were probably ready to cut me off cause I would call them like 3 times a day. At one point, I called my mom sobbing and then it was…a lot to deal with but I had a great support network around me.

GB3: My parents were really supportive like my mom would ask questions every day, how I felt and that kind of got annoying just because I didn’t wanna talk about it. My dad,
he set the settings to make it comfortable for me to talk about. My grandmas were there to pick me up from school when I didn’t feel good. My sister just kind of checked up on me every now and then cause she was at college. But overall, my dad really helped me through it and they also let me know that there are horizons that are bigger than football.

GM5: My mom is a very supportive person and with the concussions, she was with me basically every step of the way so she was just being supportive and like hey you need to rest. Did you do this? Did you do that?

ES9: The first week I was home, my mom stayed home a couple of the days with me and my grandma stayed home a couple of the days too. I felt bad because I was a pretty boring person to watch, I slept most of the day but my mom was like I just want someone in the house in case something goes wrong. They were really nice and made sure I kept eating cause I was like I’m not doing anything, I’m not hungry, I’m just sleeping all day. [They] made sure I was eating food. They would make sure I’m taking medicine at the right times. They would keep me on a 4-6 hour schedule of giving me medication because it helped my headaches. My mom was really helpful with talking to teachers so I didn’t have to deal with all of them, talking to the school, getting my doctors notes through to all of them. Just explaining my situation to them so that was really helpful. She was also helpful when it came to my coach because my club coach did not understand.

Some participants also noted times when parents were less supportive or less helpful. CS2 described how he wished his parents would have given him more information about concussions and pushed him to quit sport:

I do wish they would have pushed me a little heavier to quit. I wish I would have more education from my parents even you know back to the time growing up just to kinda hey…here’s what a concussion can do and warn me of those consequences. I think when you’re 20 years or younger, your maturity level isn’t you know up to par. You’re not really, as much as you’d like to think so at the time, you’re not making logical decisions. If you get a concussion, you’re not thinking how this is gonna impact me 20-25 years down the road, you’re thinking how this is gonna impact me for the next game on Sunday and so I wish they would’ve kinda been there to give me the big picture.

GM5 also described how her family began to label her as ‘ditzy’ and ‘scatter brained’ after sustaining multiple concussions:

I remember, I mean they were just joking, but in that span of time when I started getting my concussions to even know they call me ditzy and started defining me as a person who is ditzy and zones out a lot and scatter brained and there was a point where I started believing them. You know I’m not smart and I am very scatter brained and I am loopy. It’s just the kinda thing where if it’s constantly being repeated to you, you start believing it. No one really thought it was just a contribution to like all the concussions I’ve had…I created my own label for me because everyone was doing it and so I kind of followed suit
with thinking that like I wasn’t smart and that like accepting the fact that all of these concussions made me stupid and made me like zone out all of the time.

The way in which GM5 spoke about this experience, it appeared that her family’s reactions and comments impacted her greatly, to the point that she herself started to believe these labels that other people had placed on her.

Study participants’ stories of sport-related concussion also indicated that another important member of their support system was coaches. Coaches responses to a players’ concussions varied from very supportive and positive to very unhelpful. Interviewees GB3, ER7 and SM8 all noted supportive and positive interactions with their coaches:

GB3: They never pried me to come back cause they respected my parents and the doctors and they understood the severity of concussions. But it was nice because they always made themselves available like five of them were teachers at the school and our head coach was the dean of disciple so his office door was always open and it was just nice to have a support group outside of my friends and my family.

ER7: They showed high levels of concern but especially because all three of them actually played in my position on the field and had experience with concussions before. [They] really kind of sat me down and said look we need to focus on getting you healthy and whatever you need is what you need, but also just take this seriously because when we were in your shoes this wouldn’t have been a big deal. It wouldn’t have really had the attention it does now a days so I think they definitely saw the importance of looking at it as a whole.

SM8: My basketball coaches were really supportive and basically were like we don’t wanna lose you, we don’t want you to leave and created a student-coaching spot for me.

Interviewees JW1, HY4 and GM5 described negative interactions with their coaches that they perceived to be less helpful and less supportive:

JW1: My coaches on the other hand were not…I mean they weren’t ecstatic but at the same time I was a freshman on you know a big college team with about a hundred or so players. I don’t wanna say that they didn’t care but I think that they had bigger things to deal with than just one players concussion. I don’t think that they were that affected by it. I mean they were football coaches, a couple of them were old school guys so I definitely got, you know, not made fun of, but they gave me a hard time a little bit just making jokes here and there about me you know, are you ever gonna come back you know are you ever gonna see the field again blah, blah, blah things like that but it’s all, it was more you know fun loving kind of thing. They do that will all the injured players. It’s nothing to you know take personally, it’s just you know part of the culture.
HY4: My coach was kind of stupid (laughs). I told him I didn’t feel like the player I was because I was so reserved and he was just like oh just get back out there and do it and it was kinda of a mental block, I just couldn’t get over it. What if I get hit again? So, he was kind of annoying about it but I didn’t really care cause I kind of hated him so (laughs) it didn’t really matter to me. I mean part of that could have been cause we didn’t get along but I feel like when you’re a college coach you should be supportive of everybody. I mean that didn’t help cause now it kind of confirmed like yeah, I’m definitely gonna quit.

GM5: My coach definitely wasn’t helpful (laughs) for a lot of it because she was frustrated that I couldn’t play for her. I remember her calling me a poor financial investment (laughs) and I was just like yeah, but I mean I told her going into the recruitment that I’ve had a history of concussions so I was like I don’t know why you recruited me if you didn’t expect this to happen. There was a point in time on our team where we weren’t allowed to mention the c-word (laughs) and she didn’t really believe in concussions even though she had a lot of them herself.

Athletic trainers were also involved in many of these former athlete’s athletic lives. Some participants had their concussions diagnosed by athletic trainers, while others worked with trainers through their recovery process. One participant described in depth the relationship she had with her athletic trainer and how pivotal that was in her decision to end sport:

SM8: Specifically, just with our athletic trainer for basketball, I just spent a lot of time with her being injured, kind of just developed a friendship and then I felt like it was just as hard of a decision for her to make as it was for me to make cause obviously no one wants to be the person that says your career is over and so I felt like she was just really genuine and caring in how we had the conversation and so it made it easier I guess. I think coming from someone else it probably would have been different. It felt like she was really genuine and I knew that it wasn’t really what she wanted to do either because she wants to see me fulfill my potential too but just very much reminding me that you know to see the bigger picture and that there’s still ways to you know be involved. She was like I wanna visit you in 25 years and see you playing with your kids, not being a vegetable.

Finally, outside of sport, professors and teachers played a part in interviewees’ experience with sport-related concussions due to participants still being in school during their injury. Participants described varying degrees of support from these individuals which can be summed in the quote from JW1: “I’d say it was both ways. I had the teachers that felt really bad for me and then I had some teachers that really just didn’t care and thought that I was just another one of the students.” Some examples of helpful things that professors and teachers did noted by study participants included:

JW1: I had an English teach, for the whole semester she took away all due dates for me so that I could come in and work on the papers with her because she knew a lot of the
reading assignments and things that we had were tough for me to do cause of the concussion so I would meet with her and she would give me a summary on the reading assignments so I could write my papers without having a huge headache and taking 5 hours to do it. I think things like that were just very helpful.

SM8: I remember this class called experiencing the arts, it was a terrible a class, it was awful but I remember it required so much studying. It was all about identifying artists whether that was painting artists or sculptures or music. I remember I just had to tell him, like it was coming up on a test, and I was like I really haven’t been able to listen to the music because it hurts my head and so I remember telling him about that and his response was that’s not something to play around with, your head’s not something to play around with, just emphasizing taking care of myself. He really didn’t even say anything about the class or the test or anything and so that was something that always really stuck out with me.

ES9: My one teacher, we had something due every week for him and he just completely excused me from all the ones that I missed and was like just get the other ones in whenever you can, these other things are pretty pointless as far as actual material content so he was just like don’t worry about ‘em which was awesome which took out a huge chunk out of my missing work.

Not all professors and teachers were that helpful though. For ER7, she felt that some teachers lacked understanding: “I think it’s harder for teachers to kind of wrap their head around, especially because it’s like not a visible, physical injury.” Again, a concussion is a unique injury so if a teacher doesn’t know what a concussion is, it may impact the support that someone will receive. For GB3 and HY4, this was the case:

GB3: My math teacher thought that a concussion meant that I was mentally handicapped and it was kind of difficult to explain to her. I mean she was a 78-year-old woman who had no idea what it was and so I had to tell her I was fine, I’m the same person, it’s just right now I’m cognitively slower and can’t process calculus right now. So, she didn’t understand. My lit teacher, she knew nothing about sports and thought that a concussion was just a word or an excuse to get out of school work.

HY4: I was in a yoga-acting class and we always had to memorize monologues from Shakespeare. I had trouble memorizing it and especially right after it happened. One day we had to come in and recite it and I just looked at him and I was like I didn’t do it, I didn’t have time like that was the last thing one my mind and he just got so mad at me and so I came back in the next day with a form saying that I had a concussion and he was just like this isn’t real and I was just like okay so he was annoying about it.
From family members to coaches to athletic trainers to professors, many of interviewee’s support system, whether positive or negative, impacted and played a role in their recovery and transition out of sport.

**Sub-theme: Timing.** When a participant’s concussion occurred matters because for some, it transpired during the beginning of their college experience. More specifically, for JW1 and ER7, their concussion occurred at the beginning of the season of their freshman year in college and they both described the added complexity of dealing with this injury on top of making the transition to college:

JW1: I just was starting my first year of college and it certainly had not started out the way I had expected. I had expected to be playing football, actually on the team playing, going out, making new friends, not being stuck in my room with headaches and things like that and I think just trying to wrap my head around the fact that I’m off to a little slow start and everyone else is out making new friends and having a good time and I’m sort of sitting back and watching from the outside. It felt like nothing was going according to plan.

ER7: It was such an intense time like it was my freshman year already, I was already having this weird adjustment period and then [the concussion] was thrown into the mix… I think the typical college freshman, I don’t know what’s going on. I don’t know what to expect on top of everything else and then change for me is always scary in general. But especially going into something that you thought was gonna be set for the next four years and you’ve been used to and then all of sudden everything is flipped upside on its head. I’m in a new place. I’m no longer playing soccer, all of these plans just kind of shifted so that to me was scary in the sense that I really didn’t know what was going to be coming up next.

It was clear that the timing of their concussion prevented them from fully experiencing their freshman year of college and completely changed how they thought college would start for them.

**Sub-theme: Who Made the Decision?** When it came to ending their sporting participation, the decision was made by a variety of interviewee’s support system including parents, doctors, athletic trainers and the athletes themselves. Sometimes that decision was made by a combination of individuals. For participants who did not make the decision to end their sporting participation, the transition out of sport was difficult. More specifically, one interviewee talked about his parents telling him he was done in the hospital after sustaining his third diagnosed concussion: “My parents told me in the hospital that that was it. It was pretty much just a reality
check and I wanted to go back of course.” He went on to describe how he tried to come back to football secretively:

GB3: Senior year when I ran cross country, practices fell on the same time so I went to the first four football practices secretively and didn’t really let my parents know I did that. I mean they weren’t contact or anything and after the fourth one, one of my friends saw me and just had a big conversation with me and kind of told me like you can’t be doing this. I did try to go back but unsuccessfully.

Because the decision was not his, GB3 struggled with the transition out of sport and even tried to continue playing without his parents knowing albeit unsuccessfully. For another participant, the decision to end her soccer career was made by her doctor almost a year after her last concussion:

GM5: Then I came into January to meet up with my doctor again to let him know hey, I’m starting to feel better but I’m not like 100% yet and then he goes [name] it’s been almost a year, you can’t do this anymore. And so, I was like oh, but I really like soccer is all I’ve known, that’s been my life. And he goes yeah but you can’t do anything if you can’t have a brain. And so that’s when I was like touché and he gave me the resignation forms.

For ES9, the decision to transition from her position as goalkeeper to midfield was made by her doctor and a decision that was supported by her family. For SM8, the decision was made by her athletic trainer and she discussed how that conversation went:

SM8: She asked me to come into her office and was like I can’t feel okay continuing to put you out there in that situation and I think we both know it’s time to be done with it and I think I straight up I told her like you’re gonna have to tell me that there’s no way that I can keep playing cause I’ll be stubborn and argue with you until you continue to let me play so she basically laid it on the line and was like you need to be done.

Four participants described coming to the decision on their own. ER7 stated: “I had numerous discussions with so many people I think my head was spinning by the end of it all. So, everyone was pretty much on the same page but in the end entirely pretty much up to me to make that decision.” The other participants described coming to that decision based in part by some of the fear and risk associated with continuing to play:

NH6: I have to end the sport for the longevity of my brain… Just for my mental health that’s more important than playing sport even though it’s my favorite sport I’ve ever played.

CS2: I made the decision so I had all the information and then I continued playing and then one day, I didn’t have a concussion but I had you know skating up the ice got hit in
the back of the head from behind, the puck wasn’t there and that’s when I realized this is something that was completely unavoidable. You can shy away from a hit if you have the puck but that kind of stuff- I remember driving home from the game and decided I’m gonna be done. I’ve always been pretty physical but also undersized and so to avoid getting hit like that you would have to change your style of play which I probably wouldn’t have been good at and just it’s club hockey, it’s not worth the concussion… the risk just out-weighed the benefits.

HY4: After I was allowed to play I was scared every time we would scrimmage. I was a defensive player so I feel like the risk of getting hit is a lot higher. There’s a position called a fly so like on defensive quarters you run out defend the person whose swinging like hit and it’s like they’re hard hits so I was always scared to run out and I feel like it really disrupted my participation in it cause I wasn’t willing to be a defensive player. So, I was just like I’m too scared to do this so obviously the risk is worse than the benefit of playing and having fun so once I started practicing again I kind of realized that I don’t wanna keep doing this.

Who ultimately made the decision to end an athlete’s participation, whether it was the athletes or someone else’s, influenced the participant’s experience with sport-related concussions.

From all the interviews, it was obvious that no two former athletes experienced the same thing regarding their symptoms, how they were treated, their length of recovery, how other people responded to their concussion and who made the decision to end their sporting career. This theme encompasses how each participant experienced their concussion and the views that emerged as a result.

**Theme: Multiple Concussions.** All participants indicated they experienced numerous sport-related concussions, either diagnosed or undiagnosed. Participants spoke about their concussion history while focusing specifically on their last concussion that led to the ending of their sport participation. A few participants also discussed not reporting some of their concussions and the reasons for choosing to do so. However, whether participants reported their concussions or not, now that they have had concussions, all spoke about the increase in their and others’ awareness of and efforts to educate themselves about concussions (e.g., by reading and doing research on this injury), feeling as if they had become an “expert” on concussions, and even giving advice to others about concussions.

*Sub-theme: Description.* When asked about their sport-related concussion, participants began rattling off each concussion. It seemed to be important to participants to describe the multiple concussions they sustained as evidenced by this quote from CS2: “The last one was
what ultimately led me to my decision but I think the previous ones played just a significant of a role.” The focus of the interview, however, was on the last concussion they sustained that ultimately led to their decision to stop playing their sport and participants, to the best of their ability (i.e., some had memory loss around the concussion occurring), were able to give a vivid description of how their final concussion occurred:

SM8: It was during an open gym. I just got whacked in the face basically. I was going up for a lay-up and just got hit in the face and then kept playing and then on the next possession my team was supposed to be on offense and I was playing defense and had no idea what was going on and I think that was the first time that I was really like okay this is weird so I pulled myself out of that and then went into the athletic training room the next day and was diagnosed again.

CS2: We were playing in [city]. I was going to deliver a hit and he was along the boards and before I kind of stripped my weight to hit him, his stick went out and then caught the beginning of my skate, the front of my skate caused me to kind of toe pick and just accelerate head first into the boards so it wasn’t a player on player, it was my head going into the boards and from what I’ve read about the incident, I remember exactly up to the moment I was unconscious and I just remember waking up to a teammate saying hey are you okay and I had been unconscious from what I was told 15 to 20 seconds.

GB3: I just remember it was the third quarter and I was our punt coverage guy. I was just running down the field, had a b-line on him and then all of a sudden it was just lights out. I got hit from the side and didn’t wake up ‘till I was halfway to the hospital and didn’t really understand what was fully going on. I looked down or glanced down as far as I could cause of my neck brace and saw I was wearing football pads and stuff so I figured out I was playing football.

ER7: I was diving for a ball and it just the wrong way and it hit me and my jaw and my head went back and hit the ground so it shouldn’t have been one that would have been a concussion for most people but because I’ve had so many, I’m more prone and there gonna be more serious if I get them.

As the quotes indicate, for some participants, immediate symptoms of a concussion, like a loss of consciousness and memory loss about the events surrounding their injury, occurred.  

Sub-theme: Underreporting  Participants noted that not all of their concussions were diagnosed and provided explanations for why they were unwilling to report this injury. The reasons had to do with how important and how much their sporting experience meant to them. GB3 and the researcher (ML) had this exchange:

GB3: I had like to tell myself that I had it because I just wanted to make sure cause I didn’t wanna miss out on anything and then I kinda just said, hey I’m really feeling sick and don’t really have the energy for practice so covered that one up.
ML: So, for those that went undiagnosed, why didn’t you tell anyone that you thought you had a concussion?

GB3: It was pretty much the fear for losing the game that I love. When you have a favorite thing to do you don’t wanna be told you can’t do that anymore and after my second concussions in 8th grade that was diagnosed my parents said one more and you’re done and 3 is the magic number pretty much and I didn’t want that number 3 to happen my freshman year of high school or my sophomore year or even junior year like honestly if I wouldn’t have passed out in that game like if I wouldn’t have been knocked unconscious I would have probably done the same thing and try to cover it up and keep playing.

GB3’s comments about not reporting his last concussion if he had not been knocked unconscious were indicative of his strong “love” for sport and not wanting to let it go. Another participant, also discussed not reporting all of her concussions for fear of no longer being allowed to play:

ER7: To put it into some kind of perspective I think I got one of them at the end of my last game of high school senior season so I was done after that so I got hit, played through it the entire game and wasn’t gonna go to the trainer cause I was done. I mean I’m an awful candidate for respecting myself but I didn’t seek medical attention about it. Another one was one I shouldn’t really say anything about to anybody. I knew what it was but I didn’t think it was serious enough to say anything and I think there was also a fear of somebody telling me that I was gonna be done in high school, saying you’ve had 3 at this point you need to think about what you’re doing and I didn’t at the time really wanna hear that especially going into potentially playing college soccer at the time.

Ultimately, both participants gave up participating in their sport, despite not reporting all of their concussions for fear of just that outcome.

Sub-theme: Education/Research/Becoming the Expert/Advice. One “positive” aspect of experiencing sport-related concussion, according to study participants, was that such experiences allowed (compelled) them to become more informed about and aware of this injury. Some participants stated that their level of knowledge increased over the years as the research on concussions increased while others reported that they were not aware of how serious a concussion could be and decided to do research to become more informed. Interviewee CS2 had the following to say about his education on concussions and the research he did:

I think my level of education on how severe this could be just increased. The immediate after effect was oh, it’s a concussion, it’s part of the hockey culture. It’s a sport I love, why would I ever quit? And then through those 16 weeks reading about it, okay this is club hockey, I have much bigger things going on in my life, this is not a priority. Why
would I continue to risk the most important part of my body, my head for this? And you know you obviously read about CTE that’s when you know you start getting really familiar with all of the research that’s out there and it’s just kind of a no-brainer at that point.

CS2 believed that reading the concussion research allowed him to become more informed about the dangers of concussions and informed his decision to discontinue his sport participation. Similar perceptions were reported by HY4 and NH6:

HY4: I started doing research on it cause I was like what’s the big deal cause I didn’t really think it was that much of a problem. Whatever, a concussion is just a concussion so then I just researched it and I was in nursing classes so I talked to my professors about it so I just realized how big of a deal it was so I was just like this isn’t worth it to me.

NH6: I just read things online about how with all the mental health disorders and how concussions are starting to show signs and it could lead to…I don’t want to have Alzheimer’s when I’m 40 years old. I want my brain to be as perfectly healthy as possible so if I feel like the longevity will mean being mentally clear and not having dementia and all that stuff, that’s what I care about the most.

Other study participants also talked about how they felt that experiencing so many concussions led other people to ask them for advice on how to deal with the injury and what they should do. That is, they felt that they had become (and others saw them as) “experts” on sport-related concussions:

ES9: Now all my friends treat me as a concussion expert in the sense of if they get hit in the head, they’ll go alright [name], what are the symptoms of a concussion or if I’m feeling this, does that mean I have one? Which they do and so that’s been kind of funny where I’m just like yes, you have one if your head hurts really bad, if you’re dizzy and so I’m like yeah, I passed out after getting hit in the head now my head hurts so bad, do I have a concussion? And I’m like yes, go lay down, you’re done. So, that’s been, at least an advantage, I at least know what they are now.

GM5: This year my brother go it, my older brother got his first concussion (laughs) so it was really nice cause he called me. He was like [name], you’re really good with concussions, you know how to deal with everything. Can you tell me what I need to do? And so, I was coaching him through it… there’s a lot of good that can come out of it. I really liked the fact that I could help my older brother with his and that he would like even bother to ask me.

By being able to help others with their injury, study participants felt as if some good had come out of the situation they were in. Towards the end of many interviews, participants offered their recommendations and advice about concussions:
JW1: I still recommend other people play but I just recommend that they be a little more aware of when concussions arise because when concussions become an issue is when you get multiple ones stacked on top of each other so I think that being a little more lenient on when you get one and recovering fully before you go back is probably the most important thing.

HY4: People just need to be made more aware of how serious [a concussion] can be cause that’s what I learned from it.

ER7: My little two cents about it all is just that I think they’re something that do need to be taken seriously. I think personally I ignored a lot of warning signs. I ignored a lot of potential concussions that I didn’t wanna tell people about. I didn’t wanna be heckled about. I think it’s really important to know yourself and know your limits. So in regards to what I’ve experienced I kinda just want other people to be able to recognize that for themselves and not suffer the same kind of consequences.

ES9: I’ll still let my future kids play soccer, play football if they want to and just like hope that by then, risks are lower for concussions. I would definitely make them more aware of the potential risks just because of what’s happened to me and I wouldn’t want that for anyone else.

Being aware of and reporting concussions are an important aspect of sport participation that interviewees wanted others to know. This desire was most apparent with interviewees ER7 and ES9 who explicitly stated that they would not want the same thing to happen to someone else.

All participants experienced multiple concussions and each one played a significant role in each athlete’s experience of sport-related concussion. This theme captures meanings these former players made regarding their sport-related concussions that they also saw as important.

**Theme: Implications Beyond Sport.** An aspect of this study’s participants’ experience of sport-related concussion that is important to keep in mind is that they are all late-teenage/young adult college students who have the rest of their lives ahead of them. Therefore, it is perhaps not surprising that they talked about how their concussions affected more than just their sporting experience. Participants spoke about the struggles they had faced (and for some, still face) in the classroom. They spoke of their concerns for their ability to get a job as well as the fear of what might happen to them because of the number of concussions they sustained. It was clear that interviewees felt as if concussions affected more than just sport:

GB3: I would say that sport-related concussions affects a lot more than just sport like yeah I had football taken away from me but I also had the [school] taken away from me. Like it affected a much bigger part of my life than what I ever thought it would.
Sub-theme: Academics/Future Career. This sub-theme was expressed by participants in a few ways. Primarily study participants talked about how their concussion affected their academic performance/abilities right after they sustained as well as currently. They also discussed how their concussion may impact or already has impacted their future career. In addition, some participants spoke about academics and their future in terms of attention deficit and hyperactivity disorder (ADHD) in relation to their concussions. One participant was diagnosed with ADHD when he was younger and felt that his concussions made this worse:

JW1: I do have ADHD so that became much worse I feel because of the concussion. It was a lot harder to do homework. I had to try to find new ways to try to stay focused on tasks. I would take all sorts of weird breaks, I had these strange schedules and I was trying to find a routine that fit for me where I could get everything done comfortably with a good amount of time where I’m not trying to kill myself staying up late. Long-term, I would say that I definitely still feel some effects long-term as far as just with the ADHD. I’m a little bit less sharp I guess then I did before.

This participant perceived the added complexity of ADHD has made some of his concussions issues linger, especially when it came to academics. He felt as if he is not as sharp as he used to be. For two other participants, the diagnosis of ADHD came after they sustained concussions and are not sure whether the ADHD is because of the concussion or that they had gone undiagnosed beforehand. But either way, they perceived the diagnosis and concussion impacted their academics:

NH6: I never experienced any academic issues. As I got to [college] and I performed very well in high school so I didn’t think it was going to be that hard of a transition. I definitely think the concussion related symptoms are kind of correlated with the diagnosis of ADHD.

HY4: I was diagnosed with ADHD like I was diagnosed after three of the concussions like I’ve always wondered if that’s part of it.

Other interviewees talked about the academic issues that they faced, and sometimes still face, as a result of sport-related concussions in additional ways. GM5 believed her grades were impacted by the concussions she experienced and these grades now cause her to worry about applying for jobs:

I had trouble going to class. I remember my freshman year a lot of times, I was still in the high school mode so I was like well I don’t have to go to class. I gave them my disability sheet and the doctors note and stuff so I can just go when I feel like it except my grades tanked because turns out your professors in college aren’t as understanding because they don’t have to be. I ended up getting C’s and stuff but it is what it is so (laughs) it’s gonna
be interesting. Something that makes me nervous is applying for jobs because my g.p.a isn’t that high from my concussions. And I don’t know if it’s like a valid excuse even though it is. That’s gonna be tough now is applying for jobs.

Interviewee ES9 discussed trying to get caught up on all her school work after missing a month of school and how stressful it was to do so on top of dealing with her injury:

I mean I technically missed about a month of school with some half days in there. I remember I had a folder that was everything I had to do in it and when I came home after the first day of being back, it was about an inch thick and I was just like this is terrible. I just remember doing a worksheet and putting on the other side of the folder and that was my done side and my to-do side and just watching that slowly decrease. It was nice to see that I was catching up at some points but other points I was like this is impossible, I’m never gonna catch up, this is never ending, I’m gonna fail all my classes because the end of the school year is coming. I was so stressed out.

Another participant discussed not being able to take a class following his concussion because he had not learned enough in the last class:

GB3: I couldn’t take Spanish my senior year because I didn’t learn enough Junior year to do my fourth year of Spanish.

GB3 also discussed how his concussion impacted the major he chose in college because he felt he could no longer do math:

I can’t do math like I used to. When I applied to schools I got into six schools as an engineering major and I look back on it now and I’m like there’s no way I would be able to do it. I’ve got friends that are engineering majors and I look at their math and I know I’m not even…like AP calc was the highest level I took and I look at it and I’m like I would not be able to do any of that because I just get lost in the numbers and kind of blank out now. So, math became really hard.

Interviewee ER7 reported that the effects of her concussion on her academic career and future were noticeable and became a contributing factor in her decision to end sport:

…realizing that it was gonna effect so many other parts of my life. I already saw the effects on school just my recovery went through into September so I was starting school and I was seeing like okay my attention span is here, my ability to memorize is here so I think there’s fluctuations in that. I get headaches so I think especially, I’m in the [major] so it was kind of like okay you wanna do well, you’re in this intense program so you need to think about that.

Finally, one participant expressed how her concussion changed the way she now practices athletic training (her profession):
SM8: Honestly if anything, it’s really changed how I practice athletic training. I always say that I don’t know if that’s a good thing or a bad thing. I feel like I am maybe sensitive towards athletes who may have sustained a concussion and I feel like I’m also more reluctant to release an athlete. I’m very thorough in my like concussion evaluations and really making sure before either I send an athlete back to practice or send them you know on for further evaluation.

Though expressed in many ways, it was clear that academics and future careers were something these former athletes considered and saw as some of the meanings of their sport-related concussions.

*Sub-theme: Fear of the Future.* As suggested above, concern about future careers was a meaning of concussion. Another aspect of the future these former athletes discussed was *Fear of the Future.* This was usually mentioned in reference to the disease, Chronic Traumatic Encephalopathy (CTE), and the symptoms of dementia that are often associated with the disease:

SM8: I know I’m much more concerned with CTE than I was you know 5 years ago.

CS2: I’ve mentioned I haven’t been noticing any effects of my concussion but that’s not to say I’m not terrified of what could present itself down the road.

NH6: I don’t want to have Alzheimer’s when I’m 40 years old…it could be a possibility. I feel like taking care of my body both physically, keeping it sharp just by reading all the time, doing my school work. I hope it’s not gonna be down the road but I guess we will just have to see. I’m definitely taking precautions so that I don’t have any other concussions or anything.

ER7: In the long run, do I wanna have conversations about Alzheimer’s and dementia or whatever else there’s gonna be when I’m in my 30’s and 40’s? Like that’s not something I wanna be wanting to do. Do I wanna play soccer for the next 3 years and risk all of that?

For GB3, despite CTE being on his mind, it was not something he wanted to be worried about:

I mean pray to God CTE isn’t a thing in ten years and there’s a fix for it and everything and do I worry that I’ll get it since I’ve had 8? No, I’m not gonna worry about it at all.

All in all, interviewees believed that their sport-related concussions affected more than just their sporting experience. They discussed feeling its impacts in academics and how they thought about their future careers and for some, it created concerns for what might lie ahead in terms of their health and well-being.
**Theme: Transition.** In exploring what a “career-ending” sport-related concussion meant to former team sport athletes and the physical and psychological consequences of this concussion, ending their team sport participation was also discussed. As suggested in some of the previous themes, this decision was a process and study participants talked about how they experienced this transition out of sport. Overall, interviewees discussed how transitioning was tough for them, especially giving up something they had done for so long, as evidenced by this statement from JW1: “It was definitely tough because I had been playing football since I was in second grade and before that even I was playing basketball and baseball when until I was 5 years old so I really didn’t know a life at that point really wasn’t where I wasn’t involved in some sort of sports team.” As this quote illustrates, the transition was difficult because they had to think about both *What Do I Do Now* and *Identity*. Evidence of these meanings/sub-themes is provided next.

*Sub-theme: What Do I Do Now?* One of the first thoughts that participants said they had in making the decision to end their team sport participation, was what do I do now? To go from playing sport for years to having so much free time on their hands was a new experience and what seemed to help in that transition was having something else to do. The following quote by CS2 sums up this thought: “I think before you can really make that decision to step away from it you need to have something to replace it. And for me that was a fraternity. If I didn’t have something to transition into I probably would have second-guessed my decision.” Others expressed having a continued involvement in sport as being beneficial to their transition out of sport:

SM8: I feel like I actually had a decent transition out of sport. My basketball coaches created a student coaching spot for me so I was even able to stay on with the team and at the end of my sophomore year so in my sophomore year we didn’t have any seniors so at our last home game they made it a [name] day. I got to start the game and score the first two points and everybody clapped but I felt like that was actually probably the most helpful just because I felt like it actually gave me closure and helped me accept what was going on.

GB3: My parents brought me to [college] and I saw the [program] and everything and I was like wow that’s something I wanna do is be a coach so just having another sense of purpose around the sport that I love kind of made it a lot easier to come to terms with.

ER7: When I go home this spring I’m helping coach my high school team. So, I think side-line involvement is pretty much what I’m restrained to at this point but I mean I’ll always still have such a passion for the sport and everything that comes with it. Its’
definitely something that I don’t wanna lose entirely. I still find the same joy being around that I did when I was able to play.

Other participants conveyed some of the struggles and obstacles that they encountered as they transitioned out of sport:

HY4: I think it’s just cause my whole life I played sports you know up until I mean I haven’t for the last three years but I think it’s hard to do something for so long and then just stop doing it. I had so much time, I had no idea what to do with it so you know like it let me have time for a job and stuff but you go from going to practice every day and having a game every Saturday to nothing. So, it kinda just got boring. I had so much time on my hands and I’m the type of person that needs to be busy all the time in order to get stuff done so I was just got so bored. I was just like what do I do now so I wouldn’t get anything done.

GM5: I finally had my taste of freedom, of college life that everyone talks about because I was a collegiate athlete and you don’t get that but you’re still watched like a hawk and you have to do certain things for your program and stuff and so that part was really nice (laughs) but what I mainly felt was a lot of loneliness because I’m used to having my team and we were like a family and all of sudden they were gone and I was like aw, man now I have to make a new set of friends and how am I gonna make new friends like this is my junior year of college, everyone is already set in their friends. And so that part of it was tough.

One experience about ending team sport participation due to concussion came from ES9 who continued to participate in her team sport (soccer) after her final concussion by changing to a new position. She reported being “forced to” give up her position as a goalkeeper after enduring numerous concussions and “having to” transition to a field player. Even though she continued to play, she explained that she really struggled to adjust and come to terms with this transition both because she felt she was not very good at the field position (and therefore found no “joy”) and her playing time was limited as a result - and because it meant giving up her favorite position (i.e., goalie where she felt she was competent). Her experience is evidenced in the following exchange between ES9 and the researcher:

ES9: I was not very good [in field position]. I started a couple games because of injuries that our main players had but I once they all came back I was…there were games I got 5 minutes of playing time my junior year. There were certain games when we played a bad team when I got 25 minutes of playing time. It really just depended. But definitely in big games or in a tournament time game I didn’t get played at all so it was hard just being like yay I’m on the team but I’m not doing anything. We lost our main goalkeeper after my junior year we got this freshman as our goalkeeper because no one else was behind her in line to play. She was just a mess and I was just in my head I’m like I could have made this team and I could have made it as a goalkeeper. I would have been better than
her and it just really sucked watching that and being like that could have been me in my senior year, finally getting my shot on the varsity field so that was really hard watching.

ML: Okay and that transition out of the goal kind of giving up something that was so important to you, that you had worked so hard doing that for so long. What was that like?

ES9: I cried a lot. Going in to my junior year, that’s when I decided I wasn’t gonna play in college anymore. I looked at my skill set that I had and was like I’m lucky to make a DII, NAIA school and I was like I’m not doing that and I didn’t find as much joy playing soccer on the field as I did in the goal. I desperately wanted to go back into the goal. I would even sometimes just like on my own my pretend to train and I would make one dive and my head would just split open hurting again. I knew okay this was definitely a decision for the best just for my head but I still wish I could go back and play. I still wish I was currently playing. I don’t know - soccer was never really the same for me after that.

Though her experience was somewhat different than others because her transition out of her team sport involved continuing to play (though infrequently) for at least a short time after her concussion, her transition process highlights the difficulty all study participants had “letting go” of their team sport participation.

*Sub-theme: Identity.* At the same time participants talked about the difficulty of transitioning out of sport because it meant being at a loss about/figuring out what to do instead, many also talked about the challenge of figuring out who they were if they were no longer ‘the athlete.’ A quote by JW1 expresses this: “I wasn’t really you know [name] the football player anymore I was just [name] son, student who went to college. I think that was kind of tough to just sort of like find my own identity that way.” Although JW1 still had other identities like son and student, he was giving up the identity as a football player, one that he had held for a long time and valued - and he found that tough. Other participants also expressed dealing with an identity loss as they transitioned out of their athletic careers:

ER7: It’s weird to have to answer the question of what’s your favorite thing to do cause I can’t necessarily say soccer without having to go into all of it so I think something that would be such a simple question, to me brings about a little bit of anxiety cause I don’t really know what my answer is and I think it’s weird cause it’s kind of a little bit of an identity loss cause you identify as an athlete or identify as a soccer player for 15 years of your life and then it’s kind of what do I do now? What do I tell people?

SM8: I mean it’s as soon as you say you’re done, you’re like I’m not an athlete anymore There goes 12 years of my life like it’s just over.
Interviewee GM5 discussed her identity loss as well as struggling to figure out how to tell other people that she was no longer a collegiate athlete. GM5 said she felt ashamed that she was no longer playing at that level - and losing the sense (pride) of being “special” in being able to meet the demands of being a student-athlete:

It was a form of just dealing with things like I get to step away from the world and just play soccer and something that I was really good at and something that I’ve known and a lot of familiarity in the field so just having that stripped kind of felt like I lost a little bit of my identity of who I was. I was mostly labeled as like oh she’s [name] the soccer player and I remember also kind of being ashamed so I didn’t really tell anybody that I didn’t play soccer anymore because I was proud of being a collegiate athlete and people were like oh you played a varsity sport and you balanced academics like wow. I mean people still look at that like crazy but the second you’re like oh no I had to quit they’re like aw, man and they’re not interested anymore.

It was evident that some study participants struggled with the loss of athlete/student-athlete identity and for a variety of reasons including the length of time they had played, how much they had invested into their sport, feelings of competence, and a sense of pride/“being special”. Of the 4 athletes who spoke about identity loss, all played collegiate athletics at a DI, DII or DIII school. Two other participants spoke about athletic identity in a different way. CS2, for example, who played club ice hockey in college, indicated that while he was no longer “an athlete”, he still felt athletic:

I consider myself a past athlete and even when I was playing club I didn’t have the passion for it when I did. I was getting worse. I never really looked at it as playing college sport. I was just kinda continuing on sport but I had my mind on other things so no I would not consider myself an athlete, maybe athletic, but not an athlete.

In college this participant played club sport and thus his involvement in sport was already different than it had been earlier in his life when he reported having “more passion” for playing. Therefore, by the time he quit playing in college, he felt as if he had already given up the label “athlete” and thus he was not as attached to the sport.

Another example of a different experience of athletic identity is provided by NH6. While he had to stop participating at a competitive level in team sport (college Club rugby), he perceived himself as still being an athlete because of his continued involvement in intramurals and because he was still physically active:

I could definitely jump back into like if I did not care about my mental health I would definitely jump back into a game right now and I would probably still perform close to what I was at because now since not playing I just put all my focus and all my physical
activity into weight lifting and just trying to be in the best shape as possible because I still love playing football with my friends, basketball. Nothing where my head is gonna be an issue. I definitely say I’m very athletic like I participate in intramural soccer. I’ll play like touch rugby, flag rugby whatever and yeah I would definitely say I’m still an athlete.

To some degree, all but this one study participant expressed feeling the loss of the athlete identity. Regardless, all participants eventually transitioned out of sport and spoke at length about what that experience was like for them. In one way or another, ending team sport participation because of sport-related concussion was a challenging experience for participants.

**Theme: Invisible Injury.** As previously mentioned, the former team sport athletes who participated in this study perceived that concussion is not like other injuries because it is not one that can be seen; rather, they expressed the notion that concussion is an invisible injury. As ER7 stated: “It’s not a visible, physical injury.” Other interviewees conveyed similar thoughts about concussions:

JW1: A concussion, it’s not like a broken leg or a torn ACL where there’s actual physical proof like hey you can’t run, you can’t walk so clearly out can’t play. With the concussion, you can still or at least it appears you’re still okay cause no one can see anything actually wrong with you.

GB3: You’ll wake up on a Saturday morning with huge bruises just from the game, getting hit and um you know bruises you can see like broken bones you can tell they’re there and like other people can see them but it’s scary cause concussions you can’t see like it’s just someone walking around and you seeing them not really knowing what’s going on inside.

GM5: It’s hard cause no one can see it so no one can really tell expect if you let them know.

What study participants conveyed is that when an injury is invisible it can make you feel as if you are the only person who really knows what is going on. Further, when describing the invisible nature of the injury, participants also spoke about feeling isolated and alone as well as a lack of understanding from others. Therefore, the two sub-themes that comprise this theme (Invisible Injury) are **Isolation/Loneliness** and **Lack of Understanding**.

**Sub-theme: Isolation/Loneliness.** The invisible nature of a concussion (as well as recovery protocol) led participants to feel isolated and lonely in their recovery. This makes sense because part of recovery involves resting which may lead to withdrawal from others to rest and feel better. Further, feeling isolated because of others’ limited understanding of concussion and
the necessity of rest was heightened by what is typical college student behavior - hanging out with friends, going out to eat, late nights, and socializing in bars and clubs.

JW1: I was a freshman in college at the time so I had a single dorm. I was pretty much in my room either sleeping or with the lights off or trying to do homework for most of the time. Barely ever getting out much except to maybe to get food and eat and things like that. So really sort of almost solitary afterwards. Going out, not that I didn’t want to but going out and especially as a freshman in college, you go out on the weekends but you can’t do that with a concussion and if you do, you clearly don’t feel well afterwards. So, it’s not that I didn’t want to do any of that or had no desire to but I mean I wouldn’t feel well afterwards.

ES9: When I was at home alone I was sitting there and thinking about my friends at school and I was like why am I even friends with them. I couldn’t understand why I would care about a person enough to be friends with them. I kind of just didn’t care about anything at the moment so like I didn’t understand why I cared about friends or why I cared about my family or why I cared about anybody. It was really weird. It only lasted for like two days until my friends came over and saw me and I think I was just feeling really alone and isolated that any sort of relationship with other people felt stupid and pointless and why was that even a thing. But once I started seeing people again that started to go away just I think I was very isolated and alone with my thoughts in a sense.

Being alone from others during their recovery felt isolating for those participants.

GM5: I think concussions can be very isolating for the human, for any person and also like depends on how you deal with it and so like I didn’t like concussion because a lot of times I felt alone because no one understood. I guess isolating is a big word that I think of concussions.

That is, the isolation of the injury can be a result of not being able to do what your friends are doing, feeling “out of it” and abandoned, and/or the lack of others’ understanding of concussion. All of these only further complicated study participants’ experiences of concussion, recovery process, and transition out of their team sport.

Sub-theme: Lack of Understanding. As suggested above, the isolation and loneliness experienced by participants was in part due to their perception that others did not understand. They believed it was hard for others to know what a concussion is and what it feels like if they had never experienced the injury. This was something expressed by GM5 many times throughout her interview:

It’s very hard with concussions cause if you haven’t had the experience you don’t really know what it’s like…people don’t understand what it’s like to be concussed and how it feels. You know how they say oh, it’s in your head like it’s really not that painful and I’m like it literally is in my head, yes that is the issue.
Interviewee GB3 and ES9 also expressed a lack of understanding from some of their teammates and friends who had never experienced a concussion or simply did not understand what they were going through:

GB3: Choir group really didn’t understand and they joked about it which kinda sucked. If we sang in forte, forte they kinda joked like oh don’t sing too loud or you’ll give [name] a headache. If the lights were turned off if we were watching something and then the lights got turned on like oh be careful, we don’t wanna startle him. It was just like really insensitive but at the same time I mean high school kids are that’s just how it is. It was hard cause my friends in my junior class that I graduated with they just didn’t understand why I wasn’t allowed to play anymore and would pry and pry and pry and try to get me and my best friend to come back and play football cause he was concussion too. And in the grand scheme of things it was just frustrating to have to tell them no when really you wanted to say yes.

ES9: A couple of my friends had concussions so they understood the dangers of it and like when doctors tell you you can’t play anymore they like yeah, I get that you can’t do it anymore. But a couple of them didn’t understand that, they’re like you just got hit in the head, you’re fine just go back there the chances of that happening again are so little and I’m like actually they’re pretty high. Goalkeepers get hit in the head a lot. I would say definitely dependent on their personal experiences with concussions if they understood or not.

ES9 also talked about her families’ lack of understanding of her concussion experience by providing an example of an interaction she had with her mom:

I was just kind of sulking in my misery in a sense and all I wanted to do was be mad about everything and just hate the world at the moment and she would try to give me advice and I would just yell like you don’t understand, you’re not dealing with this right now.

Finally, SM8 described a lack of understanding from her neurologist about what she was going through:

SM8: I would always tell my mom like I don’t wanna just see a neurologist because, not that they don’t know what concussions are but I just feel like there’s a lapse [difference] between sport concussions and head injuries.

All in all, study participants perceived concussion as an invisible injury. This was an important experience of concussion that led to feelings of isolation and emanated from the perception that others, even medical professionals, did not truly understand what a concussion is or how it makes a concussed individual feel.

**Summary of Conceptual Map**
The Conceptual Map (Figure 1) was created based on the themes that emerged from the data. It depicts the relationships among the themes as well as the sub-themes that comprised each theme. The conceptual map provides the “big picture” or the “story” of sport-related concussion and its physical and psychological consequences as told by the study’s 9 participants. As noted previously, the theme Concussion vs. Injury is the context in which the other themes are embedded. That this theme is the framework for the other themes signifies the sense the researcher got from the interviewees that their experiences with a concussion were related to the actual injury of a concussion as well as “just” having an injury. As JW1 noted: “I’m sure a lot of it had to do with the concussion but a lot of it also had to do with just having the concussion.” For participants, the symptoms they initially felt were related to the concussion itself, but over time they were related to having an injury and the feelings associated with ending their participation in team sport as an intercollegiate or college club sport athlete. That is, when reading quotes from participants, it is important to keep in mind that the meanings participants made of their concussion were related to their experiences with a concussion specifically, but also to their experiences of “just” being injured (in a way that ended their team sport participation). That is, the researcher felt that the interviewees did not always make a clear distinction between the two - indicating the nuance and complexity of this injury. For example, participant GB3 questioned whether the depression he had was due to his concussion (the physical fact of the brain injury) or because he was struggling to accept that he was done playing football: “I look back on it like was I really depressed or was I just butt hurt that I couldn’t play football anymore?” The theme of Concussion vs. Injury demonstrates just one of many complexities associated with concussions that shaped the experiences of study participants.

Inside of the overarching issue of Concussion vs. Injury are five other themes: Variability in Experience, Multiple Concussions, Implications Beyond Sport, Transition and Invisible Injury. Variability in Experience is the first theme depicted and sits in the middle of the circle. This theme was presented first because although there were similarities across study participants’ experiences of sport-related concussion, each former athlete also presented her/his “own” story (were unique in their experiences). For example, while most participants experienced physical, cognitive and emotional symptoms to some degree, ER7 experienced, “chronic headache issues, nausea, a lot of fatigue” and GB3 noted, “I was very fatigued. I would sleep 16+ hour a day. I had headaches, sensitivity to light, sounds.” Participants also varied in recovery time (which
ranged from a couple weeks to almost a year). Interviewees further described varying degrees of support from their parents, athletic trainers, coaches, and professors and who it was who ultimately made the decision about ending their career. The theme *Variability* was a key part of the experience of sport-related concussions that highlights the uniqueness of concussions for these former athletes.

The next theme is *Multiple Concussions*. As noted, every interviewee sustained multiple concussions and although the focus of the interview was on the final concussion they sustained, all participants spoke of the numerous sport-related concussions they had, whether they reported or not. As a consequence of sustaining so many concussions, participants reported becoming more knowledgeable about the injury and conducting their own “research” to better understand it. Some participants also felt that they became the expert for friends and family who later sustained the same injury and offered advice for others.

The next theme is *Implications Beyond Sport* which had two sub-themes of *Academics/Future Career* and *Fear of the Future*. As noted, interviewees talked about the impacts their injury had on other areas of their life, specifically their academic performance and future careers as well as their fears for the future.

The fourth theme, *Transition*, described participants experiences with transition out of sport due to their sport-related concussion. Two sub-themes comprising this theme are *What do I do Now?* and *Identity*. Study participants talked about trying to figure out what was next, what they could do instead of participating in their team sport, and some believed that having something else meaningful to do helped their transition out of sport. They also discussed issues of *Identity*. For those who had been intercollegiate athletes, loss of athletic identity was difficult while for those who had been club sport athletes did not seem to experience the same “crisis” of identity; indeed, they created other ways to “be” or “feel” athletic.

The final theme is *Invisible Injury*. This theme was also comprised of two sub-themes, *Isolation/Loneliness* and *Lack of Understanding*. Because participants perceived concussion as an invisible injury, they felt isolated from the typical everyday life and activities of other college students (including their friends and former teammates) - and this experience was influenced by feeling that others did not understand what they were going through. This theme was also related to the sub-themes *Symptoms, Recovery Process* and *Social Support/Resources* that fell under the theme *Variability in Experience*. 

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In conclusion, what the Conceptual Map and the themes and sub-themes that comprise it indicate is that former college (intercollegiate or club) team sport athletes’ stories about or experiences of the physical and psychological effects of sport-related concussion are nuanced and complex. In the next chapter, how these findings relate to the extant research on sport-related concussions, and what they add to the discussion and our understanding of this injury, are presented.
Chapter 5
Discussion

The purpose of this study was to explore former team sport high school (club or interscholastic) and collegiate (club or intercollegiate) athletes’ experiences of the physical and psychological effects (i.e., cognitive and emotional) of a “career ending” sport-related concussion. Through semi-structured qualitative interviews with former team sport athletes, the researcher sought to understand the meanings former team sport athletes make of a career-ending sport-related concussion and if and how they experienced any physical and psychological effects of such injury. That is, while informed by existing research on the topic, the researcher examined this issue from the perspective and in the words of these athletes themselves. In this chapter, how the results of the study relate to (i.e., confirm, contradict, and/or add to) the extant research is presented. Further, study limitations are also discussed. Finally, the implications of study results for both future research and practice are proposed.

Through analyzing the data, six themes emerged that answered the question “What are former high school and collegiate team sport athletes’ experiences of sport-related concussion and the physical and psychological effects of such concussion?” These themes were: Concussion vs. Injury, Variability in Experience, Multiple Conussions, Implications Beyond Sport, Transition and Invisible Injury. Previous research has examined the symptoms of sport-related concussions, cognitive and academic demands that athletes face, the contexts of sport-related concussion (which includes athletic identity and culture of sport), and some aspects of the emotional responses of sport-related concussions. What follows are how the themes which emerged from this study connect to this past research.

Concussion Experiences

Throughout the interviews study participants repeatedly noted (in one way or another) that concussions are a unique injury and for that reason each interviewee presented her/his own story and her/his experience in relation to her/his concussion which led to the theme, Variability in Experience. Despite this variability, participants still noted similarities in symptoms. Following their concussions, eight out of nine participants suffered physical symptoms such as headaches, nausea, sensitivity to light and sound, and fatigue which is consistent with previous research (Aubry et al., 2002; McCrory et al., 2009; McCrory et al., 2013). The qualitative methodology used in the present study allowed participants to not only report the physical
symptoms that they felt, but also how they experienced them. Several participants described the headaches they experienced immediately after and the persistence of this symptom during their recovery as well as the fatigue that caused some participants to sleep for hours at a time. Allowing participants to discuss how they experienced their symptoms gives insight into the meanings of the type and degree of physical symptoms they experienced which may enhance not only medical professionals’ ability to treat athletes but all those who work with athletes to better understand the significance of concussion in athletes’ everyday lives.

As previously stated, while not as extensively explored in the research, some researchers have investigated psychological aspects of a sport-related concussion (Bloom, Horton, McCrory, & Johnston, 2004, Caron et al., 2013; Chrisman et al., 2014; Mainwaring et al., 2004). For example, Chrisman and colleagues found that a history of concussions was associated with a 3.3 fold greater risk for depression diagnosis at the youth sport level. In the current study, all participants had experienced previous concussions and some noted experiencing depression after concussion diagnosis. Another study conducted on depression and neurocognitive performance after concussion among male and female high school and college athletes found that high school athletes followed an inverted-U pattern of depression with a return to baseline levels at 14 days’ post-concussion while college athletes reported increased levels of depression after 14 days (Kontos et al., 2012). Of the participants who discussed depression, one was a high school student at the time of his concussion and one was a college student. Both participants experienced depression for longer than 14 days which may suggest that other factors at play resulted in their depression lasting for a longer duration of time. As discussed by GB3, whether his depression was due to the concussion per se and/or to having to end his participation in his sport (and all the emotions that entailed) was difficult to disentangle. Although depression is the most-cited psychological symptom reported by athletes in the extant research, irritability was discussed by participants most often in the present study. Participants discussed irritability in the sense that they felt both that others did not understand what they were going through and frustrated with how long their recovery was lasting. These results indicate that irritability is a psychological symptom that needs to be further explored.

Participants’ experiences of psychological symptoms such as irritability, anxiety and depression are similar to the psychological symptoms experienced by professional hockey players in a study by Caron and colleagues (2013). This study explored the effects of multiple
concussions on former professional hockey players and found that these athletes also experienced depression and anxiety - as well as suicidal ideation. The difference in symptoms (i.e., suicidal ideation) may be due to the specific population in each study. Further research is necessary to better understand if and how level of sport participation influences the psychological symptoms of sport-related concussion.

Additionally, two participants noted using a sport psychologist or psychologist in the treatment process of their concussion, but did not use this treatment option for very long. This has been suggested as a treatment option for athletes dealing with concussions (Guay, Lebretore, Main, DeFrangesc, Taylor, & Amedoro, 2016). It is expected that disciplines within psychology can play a critical role in enhancing athlete care by giving athletes an outlet to discuss their injury. However, one of the two athletes in the present study who consulted with a psychologist reported that he “did not open up to” the sport psychologist with whom he consulted. The other participant who discussed consulting with a school psychologist said that she felt the psychologist “jumped the gun” and “pushed [her] away” [from continuing to consult with the psychologist]. A closer look at what psychologists provide in terms of treatment for athletes dealing with this injury and what athletes need may help to provide better care for the psychological symptoms that they are experiencing.

Finally, the findings from this study revealed that participants’ recovery time lasts between two weeks to almost a year. Research indicates that recovery from most concussions occurs in a relatively short period (McCrory et al., 2013). While this was true for a few of the current study’s participants, a majority of them reported the persistence of symptoms at least 2-3 months post-injury. Indeed, other studies have found that some athletes take months to completely recover depending on the severity of the concussion (Ladevaia, Roiger, & Zwart, 2015; Leddy et al., 2012). In the study by Ladevaia and colleagues, two out of the seven children (aged 12-16 years) interviewed for the study reported the presence of physical symptoms at least 3 months after their sustained concussion. More important than recovery time, however, are the current study’s results providing insight into how recovery time is experienced or what recovery from a sport-related concussion as a high school and/or college student means.

**Transition and Athletic Identity**

One of the issues that was explored in the current study was transition out of sport. Participants discussed the role of sport in their lives and how tough it was to give up their
involvement in the sport after sustaining a sport-related concussion. Research has suggested that an athlete is more likely to have sport transitioning issues if he or she sustained a career ending injury that is unexpected (Heil, 1993). Unanticipated sport retirement is when an individual’s career as a competitive athlete comes to a sudden and unforeseen halt (Gardner & Moore, 2006). Competitive athletes can also have an anticipated transition out of sport and this is when an athlete’s career comes to an end and the athlete has expected it to end (Gardner & Moore, 2006). Athletes in the current study experienced both unanticipated and anticipated sport retirement. That is, some athletes were forced to end their careers due to sport-related concussion at the suggestion of others such as doctors, parents and athletic trainers while other participants came to that decision on their own. Career ending injuries are normally described as unanticipated but athletes in this study who sustained a concussion could have come back. However, they “chose” to transition out of sport on their own - for their mental health and because they felt as if the risk of further injury outweighed the benefits of continued sport participation.

Quite a bit of research exists on career-ending injuries, especially using qualitative interviews (Brock & Kleiber, 1994; Evans & Hardy, 1995; Ford & Gordon, 1999; Grove, Lavallee, & Gordon, 1997; Stoltenburg, Kamphoff, & Bremer, 2011). Though these studies did not focus specifically on concussions, many of the findings of the current study are in line with the findings of this previous research. For example, researchers found that athletes who sustained a career ending injury experienced difficulties with academics, tried to remain connected to their team and sport, and relied on a strong social support system (Stoltenburg, Kamphoff, & Bremer, 2011). These were also experiences that interviewees in the present study discussed as they mentioned sideline involvement such as coaching allowed them to remain connected to the sport. Another study by Evans and Hardy (1995) focused on the emotions that injured athletes experienced and their responses to those emotions. As already discussed, several participants in the current study discussed the feelings of depression and frustration that were related to their concussion and transitioning out of sport. The difficult part of sport-related concussions, especially when it results in ending sport participation, is differentiating whether emotional responses are occurring because of the concussion, because of sport transition, or a combination of the two. Other researchers have considered this issue from a quantitative perspective (Mainwaring et al., 2004) and a qualitative perspective (Caron et al., 2013). Mainwaring and colleagues noted that a sport-related concussion may result in psychological symptoms related to
the concussion and related to simply being injured while Caron and colleagues also noted the difficulties in distinguishing between symptoms being related to participants’ concussion or career termination. This suggests that those working with an athlete who is transitioning out of sport, or even just temporarily sidelined because of this injury, should consider that emotional symptoms may be related to both experiences. Additionally, further research is necessary to better understand emotional symptoms being initiated by the concussion itself and/or transition out of sport.

Finally, in reference to sport transition, previous research has found that some former athletes feel a loss of athletic identity (Brewer, Van Raalte, & Linder, 1993; Brock & Kleiber, 1994). Brock and Kleiber (1994) asked participants about events and feelings that they experienced before, during, and after their injury and participants showed a decrease in self-esteem as well as a loss of identity. Four individuals (1 male, 3 females) in the current study discussed their athletic identity. These individuals played at the Division I, II or III level of college athletics. Two other participants whose highest level of sport participation was club college discussed athletic identity in a slightly different way. For example, one mentioned that he already felt his athletic identity was diminished by the time he got to college and that he had other interests. The other participant still identified as an athlete because he was still involved with intramurals as well as fitness activities. Both of these individuals chose to withdraw from club college sport participation. It may be that the four participants in the current study who were intercollegiate (DI-DIII) athletes had a higher athletic identity though it was outside of the scope of the study to determine level of athletic identity among participants. The highest level of sport played may have factored into the way in which they spoke about athletic identity. It may be that the participants who played at the varsity collegiate level felt the loss of athletic identity more significantly and struggled with the transition out of sport because the stakes were higher for them (e.g., the recognition and status that goes along with being a collegiate varsity athlete – see Identity, p. 64-65).

Academics and ADHD

One of the key experiences of participants in the current study was related to academics. Participants discussed the cognitive symptoms that they experienced, particularly focus and memory issues, which are just two of the many cognitive symptoms that someone might experience after sustaining a concussion (Aubry et al., 2002; McCrory et al., 2009; McCrory et
Participants felt that these symptoms impacted their ability to be successful in the classroom and described how paying attention in class was difficult and would result in headaches which only further complicated the issue; reading and doing homework would take longer because it was hard to focus; and memorizing terms for exams was difficult. Participants also fell behind in their work because of the length of their recovery time or experiencing symptoms which resulted in missed classes. These issues combined resulted in an inability for participants to feel successful in the classroom. These findings are similar to another qualitative study that explored the experiences of male and female collegiate-student athletes in meeting academics demands when experiencing prolonged recovery from a sport-related concussion (Baker, 2016). Baker (2016) indicated that athletes felt their concussion recovery had a negative impact on their academic performance and experienced an inequity among the student-athletes in terms of their academic accommodations. In the present study, most athletes noted that some professors and teachers were very accommodating towards their injury and did helpful things like extend due dates or give them more time on exams while others reported that professors and teachers did nothing to accommodate their injury. These disparities in professors’ and teachers’ reactions were often explained by the participants in terms of whether or not the professors or teachers knew what a concussion was. Participants believed that if professors/teachers do not know what a concussion is they are less likely to feel comfortable giving a student academic accommodations over another student. The situation is further complicated when you consider the invisibility of a concussion (Bloom et al., 2004). For student-athletes, success in the classroom can be just as important as success on the field so it is imperative that professors and teachers are fully educated on concussions.

Related to academics, three participants revealed a diagnosis of ADHD in their interviews with one participant’s diagnosis coming before sustaining a concussion and two other participants receiving this diagnosis after their concussion. The participant with a previous diagnosis felt that his ADHD became worse and impacted his academics after his concussion and the two other participants thought the diagnosis of ADHD was a result of the concussions they had sustained. Though limited research exists on this relationship exists (Halstead et al., 2013; Reynolds, Collins, Mucha & Troutman-Ensecki, 2014), Halstead and colleagues noted that ADHD has similar symptoms to concussion and that the existence of this disability pre-concussion results in increased cognitive dysfunction and prolonged recovery post-concussion.
which probably relates to the experience of the participant who was diagnosed prior to sustaining sport-related concussions. This line of research is in its infancy and future qualitative research may consider interviews with student-athletes diagnosed with ADHD pre- and post-concussion to gain a better understanding of their experiences. As results of the current study indicate, for concussed athletes diagnosed with ADHD (whether pre- or post-concussion) part of their experiences of concussion is connected with their perceptions of their ADHD.

**Culture of Sport**

It was expected that the *culture of sport* would have a greater influence on the meanings and experiences of the participants in relation to the physical and psychological effects of sport-related concussion than what was reported. For example, sacrifice, downplaying the severity of injury, poor health as “just part of sport” have been found to define the culture of sport and influence athletes’ willingness to ignore injury (Madrigal et al., 2015). However, this idea of ‘playing through pain’ was only mentioned one time in interviews with three different participants. This may indicate that the culture of sport is changing - at least at the high school and college level - in that the idea of “being tough” and “gritting your teeth and bearing it” may no longer be recommended or tolerated by many professional organizations (Guay et al., 2015). Indeed, awareness of and knowledge surrounding concussions has certainly increased in both professional and public spheres (Boyle, 2012; Caron et al., 2013; Guay et al., 2015; Kerr et al., 2015; McCrory et al., 2017). Participants discussed fear of the future in relation to their concussion, the risk of further injury not being worth the benefit of sport and how they perceived that sport-related concussions affected more than just their sporting experience. These reasons may have led participants to feel as if playing through injury or pain would negatively impact their daily living in profound ways (Madrigal et al., 2015) compelling them to disregard the “old ethos” of the culture of sport. What may also be true is that the particular group of participants interviewed in the study simply did not think about or discuss their sport-related concussions in relation to this culture of sport. Further, this was a topic that was not directly explored in the interviews which may be important as other qualitative research that has explored the *culture of risk* and sport injuries (Madrigal et al., 2015; Theberge, 2008) found that this culture makes a difference. Hence, future research is needed to further examine the culture of sport and sport-related concussions, specifically.
What should not be understated is that two participants discussed underreporting their concussions. This finding is in line with much of the previous literature stating that athletes will not always report symptoms of a concussion (Caron et al., 2013; Bloom et al., 2004; Delaney, Lacroix, Leclerc, & Johnston, 2002; Kerr et al., 2015). A study with 53 former college student-athletes found that their reasons for not reporting concussions were that they did not think it was serious, did not know it was a concussion, did not want to leave game or practice, did not want to let the team down, and did not want to be pulled from future games and practices (Kerr et al., 2015). The two participants in the current study who discussed underreporting their concussions gave reasons similar to the ones found in Kerr’s study, stating that they did not think it was serious, did not want to leave a game or practice or future games or practices, and did not want to let the team down. Part of what makes a concussion so easy to underreport is the “hidden” nature of the injury (Bloom et al., 2004). This may influence an athlete to return to play too soon as no one can necessarily physically “see” what the athlete is experiencing unless the athlete reports it. Medical professionals and/or athletic trainers may assume athletes are okay and allow them to return to play. This may have been true for one participant who stated that if he had not been knocked unconscious with his final concussion he would have tried to hide it because his parents had told him that a third concussion would mean ending his sport participation. The results of the current study suggest that underreporting of concussions is still an issue and more needs to be done to determine what are the most beneficial methods to prevent the underreporting of sport-related concussions.

Limitations

This study provides a valuable examination of former athlete’s experiences of sport-related concussions but as with all research, results must be put in context of study limitations. This study examined former team sport athletes’ experiences of the physical and psychological consequences of sport-related concussion. As such, it was retrospective in nature. It is likely that in the time since they sustained this career-ending injury, their perceptions, feelings, and beliefs about this injury have changed. Study results need to be interpreted with this in mind.

Secondly, another caveat to keep in mind when interpreting the current study’s results is that participants varied in the highest level of sport that they played from varsity high school to Division I college. Athletes who played at the varsity high school level may reflect on their careers and concussion experiences differently from athletes who played at a higher level (as
suggested with the theme *Identity*). Additionally, participants played a wide variety of sports and positions which may have led to different concussion experiences as some sports or positions might be considered higher risk or more aggressive leading to more concussions. Further, only team sport athletes were included in the study reported here, but that does not mean sport-related concussions do not occur in individual sports like figure skating or boxing. The context of team vs. individual sport may well shape how athletes perceive their concussion (again, as suggested by the theme *Identity*).

Finally, while the current study expands our knowledge about sport-related concussions, results should not be interpreted as generalizable across the larger population of concussed high and college athletes. The in-depth understanding of this select group of individuals’ experiences of sport-related concussions are reflective of the experiences of individuals who were sampled and provide a depth and richness of information into the topic that was missing in the extant research.

**Implications for Practice**

The current study provides practical implications which may benefit policy makers, athletes, coaches, parents, and sport personnel (e.g., sport-medicine doctors, athletic trainers and sport psychologists) as it provides information that can help care for individuals who have suffered a concussion. Policy makers should also have an invested interest in sport concussion research because parents of youth athletes are concerned about this injury therefore we have seen a decline in sport participation at the youth level, especially in sports like football. Additionally, new information concerning the experiences of former athletes could inform and enhance policies that protect the short- and long-term physical, mental and emotional health and safety and pre- and post-concussed student-athletes. For example, stakeholders and researchers are now focusing on return-to-learn policies for student-athletes that can be implemented in the same way that return-to-play policies have been implemented at schools (Baker, 2016; Carson et al., 2014; McCrory et al., 2017; Singer, 2016). In fact, one of the newest updates to the Concussion in Sport Group (CISG) consensus statement was the addition of a graduated return-to-school strategy. According to the consensus statement, “schools are encouraged to have a [Sport-Related Concussion] SRC policy that includes education on SRC prevention and management for teachers, staff, students and parents, and should offer appropriate academic accommodation and support to students recovering from SRC. Students should have regular medical follow-up
after an SRC to monitor recovery and help with return to school, and students may require temporary absence from school after injury. Children and adolescents should not return to sport until they have successful returned to school.” (p. 844). This new policy may be influential in providing adequate support for the student-athlete after suffering a concussion.

This study provides one of the first empirical accounts of former athletes who were “forced” to retire due to symptoms of their concussions and the first empirical account of college students. By employing qualitative methods, participants in this study were asked to describe their experiences with their career-ending sport-related concussions in their own words/language. Specifically, participants were able to “tell the story of” the type and intensity of symptoms they experienced which ranged from physical (e.g., headaches, sensitivity to lights and sound, fatigue) to cognitive (e.g., focus, memory) to emotional (e.g., irritability, depression, anxiety) - and were asked to then discuss these in relation to their careers, academics, and career transition. Also, the use of semi-structured interviews allowed participants to emphasize topics they deemed important and allowed the conversation to follow their lead. This led to a number of unique insights (e.g., academics and ADHD) that may only be learned with a methodology allowing interviewees to tell their “stories” and to share their experiences.

These findings are beneficial for those involved in all levels of sport, and in any capacity, to better understand the short and long-term effects of concussive injury. For example, athletes considering transition out of sport due to sport-related concussions may find that other accounts of former athletes helpful or reassuring in making their decision. Coaches may increase their knowledge of concussion and recognize their importance in an athlete’s recovery. Those caring for a concussed athlete might also gain a better understanding of this injury and may consider approaching athlete’s psychological symptoms in a new way, particularly sports-medicine professionals, athletic trainers and sport psychology consultants. Professors and teachers may consider this research useful as they try to better understand what a concussion is and how they can accommodate students dealing with this injury. Finally, for anyone looking for a better understanding of concussion, these results may be beneficial as it lends a reflection of former athletes’ experiences with sport-related concussion and the meanings they made about the physical and psychological effects of such injury.

**Implications for Future Research**
Given the exploratory nature of the study and the uniqueness of the sample and topic, future studies are encouraged to continue investigating career ending concussions. Replication of this research should be conducted in the future to examine, for example, changes in former athletes’ experiences of career-ending sport-related concussions and the physical and psychological effects of such injury as experiences and perceptions may change over time and with recovery.

A qualitative study afforded a deeper understanding of participants’ experiences; however, interviews were limited to their experiences up until that point. For example, one study participant (ER7) had experienced her career-ending concussion relatively recently (i.e., within the previous year). Her story of concussion revealed that she was at a different point in her experiences from the other study participants. Future research may consider a longitudinal study that looks at athletes’ experiences with sport-related concussions over time starting from pre-injury (if possible). This may shed light on the long-term implications of the injury from the athlete’s perspective that has yet to be seen. Future research may also use other sampling methods to look at experiences of specific levels of sport (i.e., just Division I athletes or just varsity high school athletes), specific sports or even specific positions within one sport. This will help illuminate the diversity and nuance of athletes’ experiences and the meanings they make of sport-related concussions.

Additional research may also benefit from a closer look at athletes’ perspective on sport-related concussion in conjunction with the culture of sport as this did not come out in the interviews as expected. This may be due to a shift in athletes’ feelings regarding ‘playing through pain’ or may simply not have been reflective of this particular group of former athletes who were interviewed. A closer look at academics and sport-related concussions may be beneficial, especially those diagnosed with ADHD. An interesting occurrence during interviews with JW1, HY4 and NH6 was the effects of sustaining a sport-related concussion and the diagnosis of ADHD. Whether the diagnosis occurred before or after their concussion, it was clear that the concussion and ADHD further complicated their experience, especially in relation to academics. Future research exploring this relationship may help future student-athletes struggling to recover from a concussion while dealing with this cognitive impairment and could help clinicians more accurately address the needs and care of student-athletes with concussions and ADHD. Additionally, qualitative studies on teachers and professors knowledge of sport-
related concussions and how they perceive academic accommodations for student-athletes dealing with a concussion could lend a better understanding of their role in an athletes recovery. The perspective of these stake holders could provide ways in which to better educate professor and teachers on sport-related concussions and return-to-learn policies.

Finally, a mixed methods approach to sport-related concussions may provide a more complete story of athletes’ experiences with this injury. Qualitative interviews allow individuals to reflect on how they experienced their injury while a quantitative method such as questionnaires might provide in-between subject experience that may help shed light on the variability of experience found in the present study. For example, it may have been beneficial to provide the participants in this study with questionnaires on athletic identity, using the Athletic Identity Measurement Scale (AIMS) to have a better understanding of participants’ athletic identity and its role in their transition out of sport. Although much remains to be explored to fully understand a concussive injury, these results extend the current knowledge about the physical and psychological effects of sport-related concussions and how meanings are made concerning the variability in experience, multiple concussions, implications beyond sport, transition out of sport and the hidden nature of a concussion.
References


Psychology, 35(2), 168–179.


Appendix A

Interview Guide

**Research Question:** What are former team sport high school (club or interscholastic) and collegiate (club or intercollegiate) athletes’ experiences of the physical and psychological effects (i.e., cognitive and emotional) of a sport-related concussion?

1. Can you tell me about your sport-related concussion?

   What happened? When/how did you know it was a concussion?
   What happened once that was confirmed? (e.g., were you allowed to train, practice, compete)
   How long have you been out for?

2. Did you experience any physical symptoms from your concussion?

   If **YES**: What physical symptoms have you had? Can you give me an example? Tell me more about that?

   If **NO**: Okay, so you did not experience any physical symptoms?

3. How have other people in your life responded to your concussion?

   Family and Friends/Teammates
   Coaches and Trainers

   [Can you tell me how they have helped?]
   [Can you tell me more about how people have not been helpful?]

4. Do you believe you have experienced any cognitive-function effects from your concussion?

   If **YES**: What effects? How so? Can you give me an example/tell me more about that?

   If **NO**: Okay, so you have not had any cognitive effects because of your concussion?

5. What emotions or mood swings, if any, have you experienced since sustaining your concussion?

   If **YES**: Could you tell me about that? Give me an example? [ask for each one]

   If **NO**: Okay, so you have not had any changes in emotions or mood swings?

6. Do you think sport has changed for you since sustaining a concussion?
IF YES: How so? (probe for continued interest in it, involvement with team/teammates, sense of themselves as athletes)

IF NO: Okay, so you do not think sport has changed for you since sustaining your concussion?
Appendix B

Classroom Instructor Initial Contact Script

Hello! My name is Megan Loftin and I am currently a graduate student at Miami University. I am conducting research for my master’s thesis project. Because of my interest in concussions, I have chosen “physical and psychological effects of sport-related concussion” as my thesis topic.

The purpose of this research is to explore former team sport high school (club or interscholastic) and collegiate (club or intercollegiate) athletes’ experiences of the physical and psychological effects (i.e., cognitive and emotional) of a sport-related concussion. That is, this research seeks to understand what physical and psychological effects former high school/collegiate team sport athletes experienced as a consequence of a sport-related concussion and the meanings they make of (how they experienced) these physical and psychological effects of a sport-related concussion.

I am emailing you to request your permission to come to your class for 5-10 minutes (at the beginning or end of class), describe my study, and solicit students’ participation in my study. If this is possible, I will schedule a time to come into your classroom that is convenient for you. Again, my purpose is to solicit student participation in my study exploring former team sport athletes’ experiences and perceptions of the physical and psychological effects of a sport-related concussion. Specifically, I am seeking former high school (club or interscholastic) or collegiate (club or intercollegiate) team sport athletes currently 18 years of age or older who were medically diagnosed with a concussion (i.e., a certified athletic trainer or medical doctor) in the last five years and because of that concussion stopped athletic participation in that sport at the level they played at the time of their concussion.

Is this something you think you could help me out with? If so, please reply to this email and then I will be in touch to schedule a time to come to your classroom that is convenient for you.

Your assistance would be greatly appreciated and please feel free to contact me, or my thesis advisor (Dr. Freysinger at freysivj@miamoh.edu) with any further questions, comments or concerns regarding this project.

Sincerely,

Megan Loftin
loftinmc@miamioh.edu
(719) 213-8552
Appendix C

Classroom Recruitment Script

Hello!

My name is Megan Loftin and I am currently a graduate student here at Miami University. I am conducting research for my master’s thesis project and because of my interest in concussions, I have chosen “physical and psychological effects of sport-related concussion” as my thesis topic.

The purpose of this research is to explore former team sport high school (club or interscholastic) and collegiate (club or intercollegiate) athletes’ experiences of the physical and psychological effects (i.e., cognitive and emotional) of a sport-related concussion. That is, this research seeks to understand what physical and psychological effects former high school/collegiate team sport athletes experienced as a consequence of a sport-related concussion and the meanings they make of (how they experienced) these physical and psychological effects of a sport-related concussion.

If any of you are a former team sport high school or collegiate athlete currently 18 years of age or older who had a sport-related concussion and because of that concussion stopped athletic participation in your sport at the level you played at the time of your concussion and you would be willing to consider participating in my study, I was hoping that you would take the time to fill out a form I have with me today and turn it back in. This should take no more than 3 minutes to complete. You do not have to complete this form and choosing not to do so holds no consequences for you.

Your participation in my study will involve participating in a 45 to 60-minute face-to-face interview with me.

As you are filling out the form, please feel free to ask me any questions. I do want to clarify that I want to talk with former team sport athletes who were medically diagnosed with a concussion (i.e., a certified athletic trainer or medical doctor). If this does not apply to you, please do not complete the form.

If you choose to complete the form and return it to me - and you meet the criteria for the study - I will contact you via your Miami email about participating in the study. In this further email correspondence, you will be provided with more details about the interview process and given information about informed consent.

If you have any further questions, I can be reached at loftinmc@miamioh.edu. You can also contact my thesis advisor, Dr. Freysinger (freysivj@miamioh.edu), who is within the kinesiology department.

Thank you very much for your consideration of participating in my research.
Appendix D

RESEARCH VOLUNTEERS NEEDED

I am a graduate student in the Kinesiology and Health Department at Miami University conducting a study about former team sport high school and collegiate athletes’ experiences of the physical and psychological effects of a sport-related concussion.

Eligibility for the study:
Former male or female high school (club or interscholastic) or collegiate (club or intercollegiate) team sport athlete
18 years of age or older
Sustained a medically diagnosed concussion (i.e., diagnosed by a certified athletic trainer or medical doctor)
Concussion in the last five years (could have happened in high school or college)
Concussion was the reason you stopped athletic participation in your sport at the level you played at the time of your concussion

The study requires one 45-60-minute interview to:
Talk about your experiences of the physical and psychological effects of a sport-related concussion

Please contact Megan Loftin at loftinmc@miamioh.edu for more information

IRB Approval Number:
Appendix E

Recruitment Form

Name: __________________________________________

Miami email: __________________________________

Please Circle:

<table>
<thead>
<tr>
<th>Year in college:</th>
<th>Freshman</th>
<th>Sophomore</th>
<th>Junior</th>
<th>Senior</th>
<th>Other</th>
</tr>
</thead>
</table>

Are you 18 years or older?  
YES  NO

Did you compete in any high school (club or interscholastic) or collegiate (club or intercollegiate) **team** sports?  
YES  NO

*If yes, what were these sport(s)?*

Do you still compete in collegiate (club or intercollegiate) **team** sports?  
YES  NO

Were you medically diagnosed with a sport-related concussion?  
YES  NO

(i.e., a certified athletic trainer or medical doctor)

Did you sustain this sport-related concussion in the last five years?  
YES  NO

If you did sustain a sport-related concussion that was medically diagnosed, was the concussion the reason you stopped participating in your sport at the level you played when the concussion occurred?  
YES  NO
Appendix F

Initial Contact Email

You are receiving this email because you filled out a selection criteria form and met the qualifications for participation in this study.

To review, the purpose of this research is to explore former team sport high school (club or interscholastic) and collegiate (club or intercollegiate) athletes’ experiences of the physical and psychological effects (i.e., cognitive and emotional) of a sport-related concussion. That is, this research seeks to understand what physical and psychological effects former high school/collegiate team sport athletes experienced as a consequence of a sport-related concussion and the meanings they make of (how they experienced) these physical and psychological effects of a sport-related concussion. To participate in this study you must currently be 18 years of age or older and, because of your concussion, have stopped athletic participation in your sport at the level you played at the time of your concussion.

In conducting this research, I am interested if your personal experiences of the physical and psychological effects of a sport-related concussion.

If you choose to participate, you and I would meet for an interview. This interview would be comprised of us talking about your experiences of the physical and psychological effects of a sport-related concussion. The interview would take anywhere between 45 minutes to an hour to complete. I will be audio recording our interview on a computer.

If you are still interested in participating in this research and are willing to talk with me about your experiences, please respond back to this email and I will get back to you and we can schedule an interview time and place that is convenient for you.

I have attached the informed consent form that you would need to sign at the time of our interview. I am giving it to you now because it gives greater detail about your rights as a research participant and how the data that is generated from our conversations will be kept and used.

If you have any question, please contact me or my thesis advisor, Dr. Freysinger (freysivj@miamioh.edu).

Again, if you are willing to participate, please respond to this email indicating so and we will schedule an interview time and place that is most convenient for you.

Thank you very much for your time and consideration,
Megan Loftin
loftinmc@miamioh.edu
(719) 213-8552
First, let me thank you very much for your interest in being a participant in my research. By you responding, you are indicating you would like to take part in my study and be interviewed.

As noted, we will now set up an interview time and place if you have no further questions before taking this step.

Since you are taking the time to meet with me, what does your schedule look like and when may be the best time to meet? I am available most days during most times and want to work with you on when fits best for you.

When considering a place to meet, we do have a few options, including meeting in a room at Phillips Hall or somewhere in the library. If you have a preference, please indicate so now, so I can make arrangements. If you would like to meet at another location similar to Phillips Hall or the library, please let me know so I can see if the place you have in mind would work.

I am again attaching the informed consent form for you to examine and you will be required to sign one before we begin the interview process. This form is the way in which you indicate you truly do wish to participate in the research and understand your rights in participating.

Please respond letting me know you schedule and if you have a preferred place to meet for our interview.

Thank you and looking forward to meeting with you.

Megan Loftin
loftinmc@miamioh.edu
(719) 213-8552
Appendix H

Informed Consent

**Study Title:** Former Team Sport Athletes’ Experiences of the Physical and Psychological Effects of Sport-Related Concussion  
**Principle Investigator:** Megan Loftin

You are being asked to participate in a research study. I am conducting this research as part of my graduate thesis project in the Department of Kinesiology and Health at Miami University. The primary purpose of this research is to explore former team sport high school (club or interscholastic) and collegiate (club or intercollegiate) athletes’ experiences of the physical and psychological effects (i.e., cognitive and emotional) of a sport-related concussion, that is, the meanings they make of (how they experienced) these physical and psychological effects of a sport-related concussion.

This research is important because of the prevalence and consequences of sport-related concussions as well as the lack of research exploring high school and collegiate athletes’ experiences of physical and psychological effects of sport-related concussion. This study aims to add to the literature by understanding athletes’ experiences in an attempt to aid those who work with athletes in their recovery from sport-related concussion.

If you are willing to participate, I will interview you about your perceptions and experiences the physical and psychological effects of a sport-related concussion. This interview will be audio-tape recorded and transcribed verbatim. The interview in its entirety should take between 45 minutes and an hour.

There are no physical risks expected during the interview process. Potential discomforts that may occur by participation in the interview include the participant having to recall potentially unpleasant memories when talking about their experiences of the physical and psychological effects (i.e., cognitive and emotional) of a sport-related concussion. You will not be asked to do or talk about anything that exposes you to risks beyond those of everyday life. The benefit of this project is that experiences of the physical and psychological effects of sport-related concussion may be better understood and study outcomes may inform future research.

The information you provide will be collected at one-time point, and will remain confidential at all times. You will choose pseudonym initials at the time of the interview. These made up (pseudonym) initials will be the only identifier on any printed material to maintain confidentiality. At no time will your name be linked to data you provide and the data will never be presented in a way that you could be identified. You can withdraw from the study at any time with no consequences to you. The results from this study may be discussed at professional research meetings and could be printed in relevant scientific journals; however, data will be presented in a way that you or your individual responses could not be identified.
You must be 18 years old or older to participate, and taking part in this study is completely voluntary. You have the right to refuse participation in this study, with no consequences to you. If you choose to participate, you have the right to stop your participation at any time, with no penalty or loss of benefit to you.

If you have further questions, comments and/or concerns about this project, please contact the primary researcher, Megan Loftin at 719-213-8552 or loftinmc@miamioh.edu or you may also contact her thesis advisor, Dr. Valeria J. Freysinger (513-529-2710; freysivj@miamioh.edu). You may also contact the Office for the Advancement of Research and Scholarship (513-529-3600; humansubjects@miamioh.edu) for questions or concerns about your rights as a subject. Additionally, if you feel that any risk or discomfort has occurred in the process of this research that is beyond those of everyday life you may contact Student Counseling Services (513-529-4634) for further help.

I have read the above regarding the current study and I have been given a copy of this consent form. I agree to participate in this study. I understand my participation is completely voluntary, that I may withdraw at any time, and that my name will not be associated with the information I provide.

Date ___________ Date of Birth ___________

Participant's Signature

I, the undersigned have defined and fully explained the investigation to the above participant.

Date ___________ Investigator's Signature ___________

Participants will be provided a copy of this form to keep.
Appendix I

Day Before Interview Email

Hello _____,

I hope this email finds you doing well.

I am following up our last email correspondence to remind you of our scheduled interview time and place, which is at _______ at _________.

If something has changed and you can no longer meet at this time or day, please respond as soon as possible so we can reschedule if you would still like to be a part of this research.

If the time and place still work for you, please confirm again with me by responding to this email.

I, again, have attached the informed consent form that you will have to sign to participate in the research. You may print it out, sign it and bring it to our interview session or I will have a copy with me for you to sign at the time of the interview.

I thank you very much for your time and look forward to talking with you about your experience of the physical and psychological effects of sport-related concussion.

Megan Loftin
loftinmc@miamioh.edu
(719) 213-8552
Appendix J

Interview: Introductory Script

- Thank you for agreeing to participate in my research. I know that you are taking time out of your busy schedule to participate in this interview.

- I really appreciate your willingness to help me gain a better understanding of the physical and psychological effects of sport-related concussion.

- My goal for this interview is to learn about your experiences and perceptions of the physical and psychological effects of sport-related concussion.

- There are not any right or wrong, good or bad answers. Rather, I am interested in your perceptions and experiences.

- If any question is unclear to you, just let me know. If you don’t want to answer a question just say so. And of course, you are free to end this interview at any time.

- Do you have any questions for me before we get started?

- O.k., let’s get started…

  - Letter of Informed Consent
    - must be signed before interview starts

  - Background Information Sheet

- O.k., now I guess we’re actually ready to start the interview so let’s make sure the computer recorder is working…
Appendix K

Background Information Sheet

Pseudonym Initials: ________________________

Date/Time/Place of Interview:

Sex:  F    M

Age:

Race/Ethnicity:

Years of total sport participation:

Sport(s) competed in interscholastically (specifically which sports):

Sport that is focus of interview:

Was this sport your primary sport?:

Position played in sport:______________________________

How many sport-related concussions have you experienced that were diagnosed?:

________

How many sport-related concussions have you experienced that were undiagnosed?:

____________

When did you stop participating in your sport?: ____

Who made the decision to end your participation in your sport?:

Doctor    You    Parents

Other:
Were you a Scholarship or Non-Scholarship Athlete?:

Scholarship     Non-Scholarship

Other:

Were you a starter or expected/told you would be a starter?

Starter     Not Starter

Other:

Level Played:

JV High School     Varsity High School     Club High School
Club College     Division I College     Division II College
Division III College

Other:
Appendix L

Interview: Concluding Script

- So it feels as if our interview is coming to an end but before we conclude do you have any advice for others who have sustained a sport-related concussion and is there anything else you can tell me that you didn’t get a chance to say that you think will help me gain a better understanding of your experiences of the physical and psychological effects of sport-related concussion?

- Do you have any questions for me about this project?

- O.K. Well thank you very much for allowing me to interview you and for sharing all of your experiences of the physical and psychological effects of sport-related concussion.

- May I contact you again if I need any clarification concerning anything we talked about or if I have follow-up questions? Additionally, if you know of anyone who also meets the selection criteria who might be interested in participating in the study will you please give them a Recruitment Form and Flyer to share with this person you know.

- And finally, would you like a copy of a summary report of my thesis research (if yes, what would be the best way for me to give you that information?)

- Thank you again!
Appendix M

Interview Summary Form

Pseudonym Initials: ______________________________________________________

Interview Date & Site: ______________________________________________________

Start & Stop Time of Interview: ___________________________________________

1. Summarize what s/he said about their experiences of a sport-related concussion

2. What were the main issues or themes that struck you in this interview?

3. What was the demeanor (e.g., tone, expressions, body language) of the informant throughout the interview?

4. How do you feel you did as the interviewer? What do you feel went well and why? What do you feel you can improve upon and why?

5. Questions to add and/or delete…

6. Any other impressions and specifics about this informant/interview?
Appendix N

Preliminary Sense of Problem

1) I am generally interested in the topic/area of _______ concussions _______

2) A problem that I think exists that I want to better understand or explore is _______ the relationship between concussions and the psychological effects they experience _______

3) Then below discuss/describe/reflect on the personal understanding, desire for change, serendipity (chance), etc. [top of Figure 2.1 in Schram, p. 22] that brings you to your preliminary sense of problem (i.e., what you’ve discussed/described/presented in #2).

My interest in concussions lie in an experience that occurred not to me, but a very close friend of mine. In April of 2014, I was sitting in my physics class on a Monday afternoon when my friend Jordy walked in and he didn’t look so great. He began telling me how over the weekend he got into a minor skiing accident. While skiing, without a helmet I might add, someone collided with him. In this collision, he fell and hit his head pretty hard. The skiing day had just started though so despite the accident, he kept going and enjoyed the rest of his day. By that night however, he was starting to feel the effects. He spent the rest of the weekend, throwing up, unable to move and dealing with constant, brutal headaches. My response was simple, Jordy, you need to go home and see a doctor, this is serious.

I’ve had a general understanding of what it means to get a concussion for some time now. In my senior year of high school, I sustained a mild concussion while playing soccer. I spent the week taking it easy; no soccer and limited amount of studying before my athletic trainer allowed me to resume activities. I felt lucky that this injury was so minor and after a short time away from my sport, I was able to play again with no problems. That experience was my first
introduction to a concussion. I started to pay closer attention though; suddenly the media had
taken interest and the words concussion, chronic traumatic encephalopathy (CTE) and traumatic
brain injury started popping up more and more. In 2012, the documentary Head Games was
released in which it examined the effects of repeated concussions and subconcussive blows to the
head effected athletes. I was intrigued by the topic and the stories told about the NFL on the
matter. That was really just the beginning for me.

I normally saw Jordy every day; that Spring semester we had almost every class together.
He also wasn’t one to miss class very often so not seeing him on Tuesday morning was almost a
surprise but I just assumed he was getting some much needed rest after his injury. I was relieved
honestly. Later that evening he called me to ask for a ride to the hospital. He told me that he had
been at the doctors where he was diagnosed with a concussion. He then told me that doctors had
noticed a twitch in his eye, that he had hit his head so hard over the weekend that his eye had
moved ever so slightly. Something was wrong.

In 2013, I read League of Denial, and watched the associated documentary about
traumatic brain injury in the NFL, particularly concussions and CTE. The more I read about the
topic, the more I wanted to know, especially the psychological implications of the injury. It
seemed to me that researchers, the media, players, and more were interested in the physical
aspects of the injury, and rightfully so. What was the correct timeline for returning to play and
how do you treat this kind of injury? Those questions were correct and important, but I felt a key
was missing. Players like Junior Seau, Andre Waters, Tom McHale, Mike Webster and so many
others were diagnosed with CTE after their deaths and many of their family members were
describing them as completely different men. Suffering from depression, always angry and
irritable, not sleeping, anxious, paranoid, etc. Stories of former athletes killing themselves just
didn’t seem right. Was there a psychological component? Were there relationships that existed between concussions and mental health issues? These were just some of the many questions I began asking myself.

Jordy never returned to school. One of the smartest and most hard working individuals I had ever met was unable to finish his education because of the effects of a concussion. For the rest of the semester I would drop by his house to say hey and bring him food. It was hard for him to get out because he couldn’t drive, loud noises were too much and the light really bothered him. He spent most of his days sleeping and in the dark. Slowly, and little by little I could see the light go out of him. By the end of the semester Jordy moved back home with his parents. He had hoped to finish his semester over the summer once he started feeling better but if not, he would be back in the fall. Or at least that’s what we all thought.

I called Jordy at the beginning of September 2014. It was no longer him though, but the shell of the guy I once knew. He hardly ate and he hardly slept. He spent his days in the basement of his parent’s house, in the dark. The Jordy I knew loved being outside; the first time I met him a year earlier he was fixing his bike outside because summer had just started and he was going out to the mountains to ride soon. Now the only times Jordy got out of the house was to go to his doctor’s appointments. What struck me the most though was his description of how he felt like he had no purpose to live anymore. How could someone with so much ambition, so much life say those words? Was it his concussion?

Jordy had been a hockey player growing up, it was his favorite sport. In college, he played for the club team for two years at CSU before finally hanging up his skates to focus on getting into physical therapy school. I suddenly started to wonder if this injury was the one to put him over the edge. Had he had more concussions before and this one was just bad enough? Were
these repeated concussions a result now of his depression or was it something else? I felt I was starting to tie the pieces together and the many questions I had over the years were starting to make sense to me.

When I graduated with my undergraduate degree, I knew I wanted to pursue a Masters degree in Sport Psychology, and I also knew I wanted to explore concussions. From Jordy’s experiences and the things I had read in books or watched in documentaries led me to exploring the relationship between concussions and depression because to me it is a very real problem. I think the research is starting to catch up with that sentiment too.
Appendix O

Research Question(s)

Central Research Question:
What are former high school and collegiate team sport athletes’ experiences of sport-related concussion and the physical and psychological effects of such concussion?

Topical Research Questions:
How do these athletes experience these concussions in terms of their…
Continued involvement with their sport/team?
Sense of themselves as a an athlete?
Academic engagement and performance?
Relationships with friends and family?
Physical symptoms?

What are the psychological effects these athletes experience?
What are their experiences of mood swings and depression?