A CASE STUDY EXAMINING STUDENT-ATHLETES RETURNING TO THE CLASSROOM AFTER SUFFERING A CONCUSSION/MILD TRAUMATIC BRAIN INJURY

by

Sheila Jackson Benton

Liberty University

A Dissertation Presented in Partial Fulfillment

Of the Requirements for the Degree

Doctor of Education

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ABSTRACT

The purpose of this qualitative case study was to explore how a student-athlete suffering a concussion/mild traumatic brain injury copes academically in a high school environment. This case study sought to answer the question of how these student-athletes cope with their return to the classroom and are affected academically, physically, socially, and emotionally from multiple perspectives. Guiding this instrumental case study was an analytic generalization of the theory of planned behavior, social norm theory, Bandura's social learning cognition theory, and the theory of mind. This bounded case study included one participant who had suffered a concussion and was returning to a high school educational environment in South Carolina. In addition to the case study participant, data were collected from teachers, family, friends, coach, school nurse, and others who were involved during the student's concussion recovery. This data were collected through interviews, documentation, journaling, and focus groups. Data analysis includes coding for themes and triangulation of data to establish trustworthiness through credibility, dependability, confirmability, and transferability. The results of this case study revealed how the student was affected by her concussion in all areas researched: physical, academic, social, and emotional. The findings demonstrate the need for support as concussed student-athletes return to the classroom through better communication with all involved in the return to learn process, homebound instruction, and continuous reassessment of concussion protocols. Additionally, cognitive assessments should be developed to assist in determining timing for concussed students to return to the learning environment.

Keywords: student-athlete, concussion, mild traumatic brain injury, return to learn, accommodations, qualitative

Dedication

This study is dedicated to my heavenly Father and to His children who have suffered a concussion. Those of you who have suffered a concussion truly know what it is like to return to normal activities following this type of injury. Referring to a concussion as an "invisible injury" is very relatable to you. You have experienced and know that no one can see the damage created from your injury or understand the struggles and challenges that it presents.

My prayer is that everyone who has suffered and will suffer this type of injury has a quick recovery. May you find the best strategies to manage and recover from this type of brain injury. It is a brain injury, even at its mildest level. No matter the length of recovery, it is challenging to express and describe what is going on within yourself. Please express what is going on. If this study assists in the recovery process of just one person on this earth, then I have accomplished my goal of giving at least one student, if not more, a voice that can be heard by others who assist in the recovery process.

The ultimate dedication belongs to my most gracious heavenly Father, who was and is my guiding force through this dissertation process. His love and guidance are a very welcome compass throughout the entire process of planning, designing, preparing, collecting data, and final analysis. I owe all to Him.

Acknowledgments

I would like to acknowledge “Cynthia” and her bravery in taking part in this research study. Your bravery, openness, and honesty are admirable. Your strength has been unyielding. Your course to recovery has been full of obstacles. But in the end, you finished the race with all sheets in. I pray you sail through life with calmer seas and the wind in your sails.

I would also like to acknowledge my family, whose love, support, and encouragement have helped carry me through this process. Thank you to my husband, who said, “I’ve got this, if you want to go on with your education.” Thank you to the Benton boys, who supported me through reaching this goal of mine and maintained patience through the process. My prayer is that I have demonstrated how to set your goals in live and achieve them. - IRBS

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List of Abbreviations

Attention Deficit Hyperactivity Disorder (ADHD)

Centers for Disease Control and Prevention (CDC)

Family Educational Rights and Privacy Act (FERPA)

Health Related Quality of Life (HRQoL)

Individualized Education Plan (IEP)

Institutional Review Board (IRB)

Mild Traumatic Brain Injury (mTBI)

Postconcussive Syndrome (PCS)

Return to Learn (RTL)

Return to Play (RTP)

Second Impact Syndrome (SIS)

Theory of Planned Behavior (TPB)

Traumatic Brain Injury (TBI)

CHAPTER ONE: INTRODUCTION

Overview

Many high school students are actively involved in athletic clubs and organizations, either directly associated with their high school or within the community. Students who participate in these activities, especially sports, are exposed to the possibility of injury. One injury that has become a severe societal concern is a concussion, a type of traumatic brain injury (TBI) sometimes called a mild traumatic brain injury or mTBI (Centers for Disease Control and Prevention [CDC], 2015a). Research on concussions and high school students has primarily focused on students return to the playing field, with very little attention to student's return to the classroom.

This case study focused on a student's return to the classroom following a concussion or mTBI. The research included a high school student who suffered a concussion while in attendance at her local high school as she re-entered the academic environment. This chapter will consist of a discussion of the background of this study, a summary of the focus of the research, an explanation of the driving force behind the study in situation to self; details on the problem statement, a discussion of the purpose of the case study presented here, an explanation of the significance of such a study, and an explanation of the research questions guiding the study.

Background

Concussions in high school are of great concern. As of October 2017, a Google search for "concussion - high school" would yield about 2,640,000 results. Most of the research on concussions is found in medical and sports journals (Bramley et al., 2014; McGrath et al., 2013; Moser & Schatz, 2002; Pontifex et al., 2012), with specific areas of interest including the

student-athletes' return to playing sports (Carson et al., 2014; Chinn & Porter, 2013; Johnson, 2012; Mitchko et al., 2007), age factors (King, 2014; Register-Mihalik et al., 2012), and students' return to learning (Halstead et al., 2013). Halstead et al. (2013) further expressed that not enough attention has been given to academics and learning for students who have suffered a concussion and are returning to the classroom, stating that developing recommendations for a student returning to learning is a challenge.

There are many medically based articles on students' return to the classroom. However, in the field of education, there are limited empirically researched articles that address this topic. One of the few articles found is a review in *The National Association of Secondary School Principals Research Review*. This article by Hossler, McAvoy, Rossen, Schoessler, and Thompson (2014) was based on findings from Halstead et al. (2013) and provides information for principals to consider when dealing with student-athletes with concussions. The review focuses on the creation of a school team that would "offer the best hope for a full and complete recovery" (Hossler et al., 2014, p. 1). The case study presented by the authors was a 16-year-old male student and focused on the development of a team of people assisting with monitoring his recovery without adding the viewpoint of the student.

Other available information includes data reports from the CDC and other statistics from various resources (Faure, 2010; Siman et al., 2013). One article in *American Secondary Education* focused on concussion management included information on the identification of a concussion, the need for assessment, and the determination of the return to play for a concussed athlete, but dedicated only one paragraph to classroom interventions (Faure, 2010). The primary focus was the sports aspect for the student-athlete, not the education of the student, which potentially indicates the need for more empirical research around concussed students as they

return to the classroom.

Situation to Self

My motivation for conducting this empirical research is to give the concussed student a voice to express what it is like to return to the academic environment to procide insight into the student's perspective on returning to the classroom. This insight could provide a better understanding as to how to work with concussed students or student-athletes as they return to the classroom after suffering a concussion. There are "an estimated 300,000 sport-related concussions that occur in the United States with high school football players suffering nearly one-quarter of those injuries" (Faure, 2010, p. 5). With this high number of reported sports-related concussions suffered by high school students, there is a need for more empirical research on their return to a learning environment, which is a student's primary responsibility at this age.

Having a child who suffered a concussion while practicing sailing with the local high school club has enlightened me as to how limited the resources and information on concussed student-athletes are in the realm of education. As time passed, I realized that my son did not fall either into the category of the typical three-week recovery (Halstead et al., 2013; Zirkel & Brown, 2015) or the extended three-month recovery (Rohling, Larrabee, & Millis, 2012). At the end of three months, the effects of the concussion began to manifest themselves in poor grades, inactivity in class, and a lack of participation in school or out-of-school functions. The signs were present but not picked up by the teachers as being associated with his concussion. Because this all occurred at the beginning of his freshman year of high school, teachers had not had the opportunity to get to know him and thus were not able to determine that he was not himself. The misunderstood effects of his concussion led to the question of how students cope academically as they to return to the classroom after a concussion and further developed into a question of how

students who experience symptoms for an extended time are affected academically by concussions or mTBIs. This study sought out a participant who was suffering symptoms beyond the typical three-week recovery time.

Since I was aware of the passion that I have for the topic of students who have suffered concussions, any bias or preconceived notions were kept in check through bracketing myself from the study. Bracketing was accomplished through journaling, memoing, and making a conscious effort to not relate everything back to personal experience. Instead, I focused on the information and data presented for the case study.

A constructivist approach is used to interpret this qualitative study. The research focused on developing and constructing data based on the input of several perspectives on a student returning to the school setting after suffering a concussion. These varied views represent the realities of each person associated with the student and added rich data to the study. Stake (1995) described the role of the researcher of case studies in this way: "Of all the roles, the role of interpreter, and gatherer of interpretations, is central" (p. 99). The world as we know it is our reality. Through various data collection methods, the existence of the issues and needs surrounding the student participant are used to construct better understanding of the phenomenom of returning to the classroom following a concussion.

Several philosophical assumptions underpinned this research. This study involved gaining the perspectives of various people in the academic setting who were in daily contact with the student as she returned to the learning environment, including family, friends, teachers, coaches, and other school personnel. The ontological nature of the study presented itself through the different perspectives, or individual realities, of the study that were reported and the themes that began to emerge. Patton (2015) elaborated on how ontological relativity is based on

worldviews, and worldviews are not "determined by empirical or sense data about the world" (p. 122).

Other assumptions are woven throughout the study. For example, an epistemological assumption was brought to this study through the interviews at the student's school with the people whom she was in contact with daily: family, friends, teachers, coaches, and other school personnel. Using persons in direct contact with the student minimized the distance between the participants and myself, building positive relationships and enabling the use of quotations as evidence when presenting the data analysis (Creswell, 2013). Additionally, through the personal values and biases that shaped this study, one may be reminded of an axiological assumption. The design and conduction of this study may be seen as methodological, as the details were analyzed before generalizations were made.

Problem Statement

The problem is a lack of empirical research in the field of education on how students cope in the academic setting following a concussion. A study conducted in New Zealand concluded, "A significant absence identified in the literature is that of children's functioning in school setting after mTBI" (Case, 2014, p. 34). The empirical research to date primarily is found in medically based journals, including pediatric medical journals, sports medical journals, and journals for nurses and athletic trainers. According to Davis and Purcell (2014), "Currently, there are not clear guidelines to guide the return to school for youth who have sustained a concussion, although this is an area of increasing interest" (p. 3). Rosenthal (2012) conducted a similar study to this one on the effects of a TBI on students in a local BRAINSTEPS program. She stated that very little is known by educators about TBIs and how to deal with them in the classroom (Rosenthal, 2012). Other studies have been conducted on TBIs and college-aged

students (Carulli, 2014) and on educators' perceptions of working with students with a TBI (Case, 2014). This study aimed to explore how a student-athlete suffering from a concussion or mTBI copes academically in a high school environment from the educators' perspective.

An mTBI differs from a TBI in severity and is often referred to as a concussion. With the number of high school-aged students and student-athletes sustaining concussions, more information is needed on their return to the learning environment. More recently, Weber, Welch, Parsons, and McLeod (2014) evaluated school nurses' perceptions of academic accommodations following a student's concussion and did not include perceptions or input from educators or students.

According to Rohling et al. (2012), there is a possibility that more patients with concussions or mTBIs suffer long-term symptoms than what is reported in many studies. Siman et al. (2013) presented studies supplying evidence that 15–30% of patients with mTBIs suffer from symptoms for three to six months after the injury (Siman et al., 2013). Student-athletes may not report the symptoms that they are experiencing following a concussion because they think their coach or teammates may think less of them if they reveal their difficulties (Kroshus, Garnett, Hawrilenko, Baugh, & Calzo, 2015). For this reason, their symptoms may go unknown by the people around them. If students are not sharing what they are experiencing, educators will not know to implement appropriate accommodations to assist them in their return to the academic environment.

Much of the literature focuses on a return-to-play (RTP) protocol. For instance, Davis and Purcell (2014) stated,

> It is recommended that this return-to-play protocol be cautious and individualized in paediatric athletes, regardless of level of participation, as there is evidence that younger

> athletes take longer to recover from concussion . . . and have more effects from concussion. (p. 3)

Since younger athletes take longer to recover from a concussion, one might expect that a heavier focus would be placed on returning to learning. However, according to Halstead et al. (2013), "Little attention has been given to academics and how a concussion may affect the young student learner" (p. 949). The authors also stated that developing guidelines for student-athletes' return to the classroom had been a challenge due to the limited research that exists in this area of concussed students returning to the learning environment and managing their concussive symptoms (Halstead et al., 2013). Carson et al. (2014) echoed this view, acknowledging that students many times have to meet educational requirements without accommodations after suffering a concussion. Needless to say, "Return to learn should precede return to play" (Davis & Purcell, 2014, p. 3).

Few studies provide an in-depth understanding of how a student-athlete suffering from a concussion or mTBI copes academically in a high school environment. This case study sought to explore, from multiple perspectives, how one concussed student coped academically in the classroom, providing an in-depth understanding of the potential impacts of a concussion in the educational environment. The concussion knowledge of school personnel is paramount to the student's success in returning to the classroom (Halstead et al., 2013).

Purpose Statement

The purpose of this qualitative case study was to explore how a high school student-athlete coped as she returned to the learning environment following a concussion and thereby provide a detailed description of this phenomenon. This case study was conducted at a high school in South Carolina. As the primary participant was being sought, I worked with

individuals at the high school to assist in identifying a potential primary participant for the study. Once the primary participant had been identified and consent and assent (Appendix D) had been secured for the student to participate, I began to access the school faculty that had direct contact with the student. The study focused on a student who had recently suffered a concussion and experienced symptoms well beyond the typical recovery period of three weeks. Data were collected from the primary student and her family, friends, teachers, coaches and others associated with her return to the academic environment. The data about the student's return to the classroom were then analyzed and coded for themes.

The theory of mind and the theory of planned behavior (TPB) guided this study. Premack and Woodruff (1978) presented the idea of theory of mind over 35 years ago, relating it to the perceptions of social cues and predicting the behavior of others (Byom & Turkstra, 2012). This theory was utilized in this study as student-athletes and others were asked how the primary student was affected by the concussion academically. The TPB was used with the participants, as this theory pertains to behaviors and the reporting of symptoms to teachers, friends, and coaches about their own injury and recovery. Register-Mihalik (2013) used the theory of reasoned action and TPB to assess concussion reporting behaviors of young athletes, concluding that "favourable attitudes toward reporting and social referents' beliefs have the greatest impact on intention to report concussion symptoms" (p. 878).

Significance of the Study

The purpose of this study was to explore, describe, evaluate, and develop possible explanations of how concussed students cope with their return to the classroom and routine activities. Most of the information concerning student concussions and recovery from a concussion is found in medical, sport, and nursing journals, and the majority are quantitative in

nature. This study sought a deeper understanding of the perspectives of concussed student-athletes and the people around them as they reenter their academic environment in order to add information that is relevant to the educational setting. Other studies have focused on perceptions of nurses (Weber et al., 2014), developed protocol from a group of health professionals (DeMatteo et al., 2015), and surveyed parents and children on symptoms at four weeks post-injury (Ransom et al., 2015). Some medically based meta-analyses include information on how concussions differ in young children (Davis & Purcell, 2014), persistence symptoms after a concussion (Zemek, Farion, Sampson, & McGahern, 2013), and TBIs in students (Rosenthal, 2012).

This study used qualitative methods to explore how a concussed high school athlete coped with her return to an academic environment after suffering a concussion. To add depth, this study includes an analysis of how physical, social, and emotional factors contribute to how the student coped academically when returning to a learning environment. Few, if any, studies have focused on how a concussion affects students as they return to learning in relation to academics, emotions, social interaction, and physical effects. Carson et al. (2014) and Halstead et al. (2013) both expressed concerns in their studies that enough is not known about student-athletes' return to the classroom and what accommodations or adjustments may need to be implemented on their behalf. This qualitative case study adds much-needed empirical knowledge to the field of education to better understand a student's return to a learning environment following a concussion from the perspectives of the student and the family, friends, teachers, counselors, and others associated with the student.

Through exploring how a student-athlete coped as she returned to an academic environment using the theoretical lens of the TPB, this study addresses concussion and

concussion symptom reporting. Using TPB as a theoretical framework assisted in identifying concussion reporting behaviors as it relates to returning to the academic environment.

Research Questions

The primary research questions guiding this study are based on the gaps found in the literature. The gap is the lack of empirical, educational studies conducted about concussions and a student's return to the classroom. As Baker et al. (2014) put it, "There are limited empirical data specifically addressing the academic effects of concussion" (p. 1286). Register-Milhalik et al. (2012) identified three types of abilities that are affected by a concussion: cognitive, physical and behavioral. This study, centered on the return to the classroom, included a look at a student-athlete through her academic environment, including her social interactions, emotions, and physical conditions. Many questions have arisen while researching this study.

1. Central Question: *What is it like for a student-athlete to return to school after suffering a concussion*?

Common physical symptoms include fatigue, difficulty concentrating (DeMatteo et al., 2015), headaches, neck pain, dizziness, balance problems, noise and light sensitivity, low energy, downiness, and blurred vision, causing student-athletes to not "feel right" (Zemek et al., 2013, p. 260).

A. Subquestion: *How do these physical effects of a concussion affect the student-athletes' return academically*?

Jantz and Coulter (2007) described the physical consequences of a concussion can cause neurological, cognitive, emotional, and behavioral issues. The nature of headaches that one may suffer creates the "inability to participate in group activities and a desire to avoid or withdraw from friends and school" (Jantz & Coulter, 2007, p. 87).

B. Subquestion: *What are the social implications for student-athletes in a school setting as they are dealing with symptoms of a concussion*?

Emotional symptoms can include anxiety and depression (DeMatteo et al., 2015), which leads to the question of what it is like emotionally for a student-athlete to return to the academic environment.

C. Subquestion: *How are emotions, interactions with others, and participation in the academic environment affected by the concussion*?

In order to gain insight on the emotional and social consequences of a concussion, data were gathered from the student-athlete and those surrounding her. Students with injury or illness are in contact with teachers, coaches, counselors, and the school nurse, all of whom could have been included in this study. Previous studies (Rosenthal, 2012) have suggested gaining insight from siblings and friends along with medical professionals associated with the student-athlete.

Definitions

1. *Centers of Disease Control and Prevention* (CDC) – An agency whose mission is to protect Americans in the areas of health, safety and security threats by providing health information to the public (CDC, 2014).
2. *Concussion* – A head injury caused by an impact, that creates causing a "generally completely reversible impairment of neurological function that resolves spontaneously" (Bramley et al., 2014, p. 784). Concussions can have short- and long-term effects on an individual (Bramley et al., 2014).
3. *Individualized Education Plan* (IEP) – A plan put in place for a student under the legislation of the Individuals with Disabilities Education Act (Zirkel & Brown, 2015).

4. *Lystedt Law* – A law named for a teen who suffered a concussion and returned to the same game only to be injured again, becoming permanently disabled after the second concussion (Chinn & Porter, 2013; Doheny, 2014). This law requires the removal of a player from play if a concussion is suspected after an impact (Doheny, 2014).
5. *Mild traumatic brain injury* (mTBI) – An injury "that induces physiological disruption of brain function" (Davies, 2011, p. 1).
6. *Postconcussion symptoms* – Symptoms that do not resolve themselves after a week or two (Oldenburg, Lundin, Edman, Nygren-de Boussard, & Bartfai, 2016; Stoler & Hill, 2013), including, but not limited to, headaches, dizziness, fatigue, irritability, reduced concentration, sleep disturbance, memory dysfunction, sensitivity to light or noise, double or blurred vision, frustration, restlessness, anxiety, and depression (King, 2014).
7. *Postconcussive syndrome* (PCS) – A term used to describe when a concussed person is experiencing persistent concussion symptoms (DeMatteo et al., 2015; Lewandowski & Rieger, 2009; Zirkel & Brown, 2015).
8. *Return to Learn* (RTL) – A student's return to the learning environment after a concussion. Master, Gioia, Leddy, and Grady (2012) recommended a gradual return, with parents and teachers monitoring the student's progress to make adjustments as needed.
9. *Return to Play* (RTP) – Approval for a student-athlete to return to the playing field from a physician who has monitored the student since the time of injury, parents, and those in the school setting (McGrath, 2010).
10. *Secondary impact syndrome* (SIS) – A second concussion suffered soon after the first concussion. SIS can happen when a player returns to a game too soon after suffering a

concussion (Chinn & Porter, 2013) and could be catastrophic (McGrath, 2010) or even fatal (Carson et al., 2014).

Summary

A concussion is serious at any age. It is an injury to the brain that takes time to heal. Very little is known about effects of concussions on students in high school as they return to the learning environment. There is no specific time frame for an adolescent or school-aged student to recover from a concussion. The many factors surrounding concussion recovery will be discussed further in Chapter Two. The perspectives of students, their family, friends, teachers, counselors, nurses, and coaches have not been explored as a whole, as this study does.

CHAPTER TWO: LITERATURE REVIEW

Overview

Research on concussions among student-athletes is primarily found in medical journals, pediatric journals, sport training journals and journals for school nurses. The identification and treatment of a concussion are greatly discussed in these articles, and less attention is given to the student-athlete's return to the classroom. The information is directed toward professionals of several types, from medical doctors to athletic directors. There is an insufficient number of empirical, peer-reviewed, journal articles specifically for educators on the students' return to the classroom. Therefore, this literature review is very medical in nature.

This literature review will include the theoretical framework that added focus to the study along with an extensive literature review of concussions as they relate to high school students. Much of the following literature examines symptoms, recovery time frames, return to activities, and recommended student support. What it lacks is information on how student-athletes cope with their return to academics from the view of the student. This study focused on how a student coped as she returned to the academic environment, adding researched-based information on this process to the realm of education.

Theoretical Framework

Many theories have presented themselves through the literature discussed in this review. These theoretical propositions, associated with several quantitative and qualitative studies, brought a variety of perspectives to this research as it was being conducted, forming what Yin (2014) refers to as analytic generalization. Several psychological theories establish the groundwork for the analytic generalization and potentially expand upon the theories presented here, including TPB, social norm theory, theory of mind, and Bandura's social learning cognitive

theory. In addition to the psychological theories, one developing theory on the physical recovery of the brain was included, as this study is based on how a recovering student-athlete copes with the academic environment. Using theoretical propositions, the groundwork for analytical generalizations will be laid out (Yin, 2014). This case study sought to shed light on the primary participant in the case study and generalize findings and lessons learned based on Robert K. Yin's (2014) "Use of Theory to Generalize from Case Studies" as presented in *Case Study Research Design and Methods*.

Theory of Planned Behavior

There has been much literature on concussiond that uses the theoretical framework of TPB, which is based on the attempt to predict a person's intent to engage in a particular activity at a particular time (Boston University School of Public Health, 2013). Kroshus, Baugh, Daneshvar, and Viswanath (2014) further explained, "The theory of planned behavior can help explain concussive symptom reporting behavior among late adolescent male athletes. Programmatic and informal communication with athletes about concussions should address population and context-specific perceived consequences of reporting, subjective norms, and reporting self-efficacy" (p. 269). Using TPB to explain students' reporting behavior will help guide the development of concussion education for student-athletes by facilitating the consideration of influences that may be a factor for students (Kroshus et al., 2014).

Studies to date have examined the knowledge and attitude that a student has toward a concussion, leaving out many other factors that may be involved. In many cases, a student-athlete may understand the seriousness of a concussion but still not report it to others (Register-Mihalik et al., 2013). According to Register-Mihalik et al. (2013), "What an individual believes and feels about concussion reporting can certainly play a role in their decision to report, as can

what they believe other around them thing about concussion reporting" (p. 884). Underreporting due to the fear of negative consequences for the player has also been identified as a problem by Kroshus et al. (2014).

The TPB has been applied to a study of athletic trainers to better understand their beliefs on concussion management guidelines (Rigby, Vela, & Housman, 2013). Following the First International Convention on Concussion in Sport held in Vienna in 2001, a multifaceted approach to evaluating and managing sports-related concussions became a recommended practice for athletic trainers and coaches. This study further broke the TPB into four guiding constructs: "attitude toward the behavior . . . subjective norms . . . perception that the individual has control over performing a behavior . . . and the individual's intent to perform or not perform the behavior based on the weight of the first 3 constructs" (Rigby et al., 2013, p. 637). These constructs offer valuable insight into the application of TPB as it was used to look at athletic trainers' beliefs and attitudes. These constructs can also offer a better understanding of how a student-athlete may react to being diagnosed with a concussion.

Social Norm Theory

In a quantitative study, Kroshus, Garnett, Baugh, and Calzo (2015) used social norm theory as a foundation to design more effective concussion reporting education for student-athletes. With this approach, misperceived group norms were addressed and corrected to improve the reporting of concussions. In this study, it was discovered that a substantial portion of those surveyed did not report symptoms and continued playing after sustaining a concussion, yet this same study demonstrated that most athletes thought that their own reporting attitudes were safer than that of their teammates (Kroshus, Garnett, Baugh, & Calzo, 2015, p. 1009). This study clearly demonstrates the need for future concussion education for student-athletes to be

developed to correct misperceived group norms and prevent further injury to players. Social norm theory is also used to describe the social pressures that may influence the behavior of the injured student-athlete.

Bandura's Social Learning Cognitive Theory

Kroshus, Garnett, Hawrilenko, et al. (2015) built the TPB using Bandura's social learning cognitive theory to outline the relationship between "psychological determinates of behavior, environmental factors, and behavior" (p. 69) by suggesting that the student-athletes' perceived norms can affect their reporting behaviors. Miller (2011) further described these components as "biological and psychological characteristic of the person (*P*), the person's behavior (*B*), and the environment (*E*)" (p. 239), referring to them as "triadic reciprocal causation" (p. 239). Triadic reciprocal causation provides a model of behavior change based on the three influences of the person, behavior, and environment. The environment is further broken down into the categories of imposed, selected, and created (Miller, 2011). While the school environment is imposed on students, students can choose their classes, creating a selected environment. As Miller (2011) put it, "The most novel features of this three-pronged model are that children actively select certain environments and their behavior even helps shape their environment, which in turn acts on them" (p. 263).

In a more recent study, Kroshus, Garnett, Hawrilenko, et al. (2015) combined the use the three previously discussed theories—TPB, Bandura's social learning cognitive theory, and social norm theory—to investigate reporting behaviors of student-athletes on the collegiate level. This study looked at concussion knowledge, history, continued play, reporting intentions, pressure to play, and other characteristics of student-athletes. They discussed the pressure to gain social approval that athletes face. In this study, almost half of the students surveyed continued to play

in their game or practice after a sustaining a concussion. The study explained that at times, the lack of reporting "may be related to the construct of perceived behavior norms, from the theory of planned behavior" (Kroshus, Garnett, Hawrilenko, et al., 2015, p. 67). The authors explained that the gap between individual behaviors and group behaviors creates pressure for a student-athlete to act a certain way. This type of study could apply to high school athletes in determining their concussion reporting behavior.

Theory of Mind

The theory of mind is rooted in social cognition, in particular, social interactions and the ability to interpret others' thoughts, beliefs, intentions, and desires (Bibby & McDonald, 2004). Theory of mind can be used as a tool to analyze communication with someone who has suffered an mTBI. It also applies to people who surround the person with the concussion or mTBI and their perceptions of what the concussed person may be thinking or perceiving of the world around them. This theory is based on the ability to recognize and make inferences about the intentions, beliefs, or mental status of other people. A person's mental status would include thoughts, beliefs, desires, emotions, intentions, and attitudes (Stronach & Turkstra, 2008). Theory of mind is what separates primates from other animals because primates use nonverbal clues to predict another's behavior. In general, these nonverbal cues are also used between humans in social interactions (Bibby & McDonald, 2004; Stronach & Turkstra, 2008). It is believed that the elements of theory of mind begin as early as 15 months in humans, when pretend play is recognizable by a toddler (Stronach & Turkstra, 2008). Theory of mind has been used to assess persons with disorders such as Asperger's syndrome or autism. It recently has been utilized in evaluating patients with TBIs by revealing domain-specific areas of cognitive functioning (Milders, Ietswaart, Crawford, & Currie, 2006).

Developing Theory

Molfese (2015), in his article "The Need for Theory to Guide Concussion Research," formed a theory to guide the research on how the brain develops cognitive processes. He stated that the field of brain research with concussions research "has largely progressed through an accumulation of data without the guidance of any systematic theory to guide the formulation of research questions or generate testable hypotheses" (Molfese, 2015, p. 1). This statement is in reference to the idea that the brain's neural network is disrupted during a concussion, which creates issues with cognitive processing speed, with recovery requiring new neural networks to develop. The development of new neural networks is compared to learning new skills and information. This theory frames the physical, neurological recovery following a concussion and benefitted this study on how student-athletes cope as they return to the academic environment following a concussion.

The psychological theories presented in this review include the TPB, social norm theory, Bandura's social learning cognition theory, and the theory of mind. These psychological theories give a lens through which to look at the behaviors of student-athletes once they have suffered a concussion. Individual reporting behaviors potentially impact the recovery management of the injured student-athlete in the classroom. These psychological theories are supported by the developing theory of disrupted neural networks and cognitive processing speeds.

All these perspectives combined allow for the observer to consider the environment surrounding an individual with a concussion, the individual's attitude toward concussions; the indivdiual's perception of what others may think, the norms within their social group or team, the individual's interpretation of social cues, and how the individual interacts with and shapes

the environment. The impact of physical damage to neural networks as a student-athlete recovers from a concussion was kept in mind throughout this research. All these theories guided this case study on how a student-athlete copes academically in a high school environment while recovering from a concussion. This study's findings can add new knowledge to the existing theories.

Related Literature

Concussions are typically a closed head injury that cause a person to lose consciousness or experience amnesia or a change in mental status. Also known as an mTBI, a concussion is a "generally completely reversible impairment of neurological function that resolves spontaneously" (Bramley et al., 2014, p. 784). Carson et al. (2014) presented in the consensus statement from the 4th International Conference on Concussion in Sport the following definition of a concussion: "a complex pathophysiological process affecting the brain, induced by biomechanical forces" (p. e312). Zirkel and Brown (2015) stated that an "mTBI is caused by a blow or jolt to the head that disrupts the function of the brain. This disturbance of brain function is typically associated with normal structural neuroimaging findings" (p. 99). This definition of a concussion is developed further by others such as Davies (2011), who described the injury as "the sudden movement caused stretching and tearing of brain cells; cells become damaged and chemical changes occur within the brain" (p. 1), disrupting the way cells in the brain normally function (Sarmiento, Mitchko, Klein, & Wong, 2010). Throughout the literature reviewed, the terms *concussion* and *mild traumatic brain injury* (mTBI) are used interchangeably.

Concussions have gained a great deal of attention in past years. Close to 7,000 scientific articles on concussions were published in 2012 alone, and when an Internet search is conducted for the term *concussion*, more than 15,000,000 results are shown (Popoli, Burns, Meehan, &

Reisner, 2014). In the current literature, many common themes appear related to the research on concussions. The literature offers descriptions of a concussion along with a wide range of symptoms and recovery issues. The recovery from a concussion and returning to activities is also discussed. For example, Register-Milhalik et al. (2012) stated, "Concussion is a serious injury that occurs at all levels of sports and can affect the cognitive, physical, and behavioral abilities of an athlete" (p. 297). Students experience cognitive, physical, and behavioral symptoms in the classroom and outside of school. With the growing number of concussions suffered by student-athletes and the considerable amount of time that students spend at school, schools are in a primary position to assist injured student-athletes in their return to the academic environment as they recover.

Concussions

Although sports and recreational concussions number about 1.6 to 3.8 million occurrences each year (Johnson, 2012; Halstead, Walter, & The Council on Sports Medicine and Fitness, 2010; Lincoln et al., 2011; McAvoy, 2012), many more concussions are sustained from other incidences such as accidents, assaults, and falls (McAvoy, 2012). Oldenburg et al. (2016) stated that 70 to 90 percent of all brain injuries are considered to be mTBIs.

The difference between an mTBI and a TBI is the assigned score from the Glascow Coma Scale (Teasdale & Jennett, 1974). Scores on the scale range from 3 to 15, and scores that fall between 13 and 15 indicate a mild injury or no impairment of consciousness (Lewandowski & Rieger, 2009). Seventy to 90 percent of reported brain injuries are determined to be an mTBI. An individual with an mTBI experiences one or more of the following symptoms: loss of consciousness, loss of memory, altered mental state, or focus issues (Oldenburg et al., 2016).

Concussions in youth. According to Underwood (2016), "Reports of concussion caused during professional athletic play are common. But concussions can and do happen elsewhere—in everyday life and in school athletics" (p. 74). Sixteen percent of children under age 10 have received medical attention for a head injury, and most concussions are reported in children between the ages of nine and 22 (Zemek et al., 2013). Because a child's brain is still developing, the "force required to produce a concussion is greater in children than adults" (Davis & Purcell, 2014, p. 1). Sarmiento et al. (2010) reported the CDC has estimated sports-related TBIs to be numbered at 135,000 for ages 5–18 annually. Eisenberg, Andrea, Meehan, and Mannix (2013) reported that emergency rooms in the United States saw approximately 144,000 children yearly with concussions and that millions more not included in this count are treated by doctors, athletic trainers, and specialists. Approximately 23,000 football-related brain injuries are seen annually in emergency rooms across the country, and 90% of patients seen for these injuries are between the ages of five and 18 (Johnson, 2012). The actual number of concussions is unknown but is speculated to be much greater than reported (Pieper & Garvan, 2014). Of the children seen in the emergency room, over 90 percent are considered to have a mTBI and are discharged. (Pieper & Garvan, 2014).

Davis and Purcell (2014) discussed the differences between a child's developing brain and skull and an adult's. The physiological differences affect the recovery rate for the different age groups. Children cannot be expected to recover in the same way as an adult. In a meta-analysis, Dougan, Horswill, and Geffen (2014) reported, "At first assessments conducted 1–10 days following injury, adolescent athletes demonstrated larger post-concussion neuropsychological deficits, on average, than adult athletes and reported marginally more

symptoms" (pp. 71–72). Dougan et al. (2014) indicated that age is a factor in the overall effect of a concussion, as adults reported fewer effects of the concussion on the 10-day post evaluation.

Many high school students participate in sports each year. Although not every student is an athlete, concussions have become an increasing concern within secondary schools (Rycik, 2015). Hunt (2015) estimated that 7.7 million youths participate in at least one high school sport, and Kroshus, Garnett, Baugh, and Calzo (2015) put this number at more than 8 million. With this large number of students playing sports, there is ample opportunity for a student to experience a concussion, although unlike other sports injuries, a concussion may be hard to detect (Lincoln et al., 2011). In fact, "On average, across all sports and both genders, more than five concussions are diagnosed per 10,000 athlete exposures to a game or practice" (Kroshus, Garnett, Baugh, & Calzo, 2015, p. 1004). With this great potential and the statistics supporting the frequency of these incidents occurring, schools may want to consider what action can be taken to protect their students. Faure, Moffit, and Schiess (2015) advocated for school with athletic programs to have full-time athletic trainers on staff to monitor both games and practices. It has been shown that a significant number of concussions are sustained during practice, although the incidence is higher in games (Dompier et al., 2015).

Concussion reporting. Researchers have found that over 50 percent of athletes do not report concussions when they occur (Hunt, 2015; Kroshus et al., 2014; Lewandowski & Rieger, 2009; McCrea, Hammeke, Olsen, Leo, & Guskiewicz, 2004). This lack of reporting has been attributed to athletes' inability to recognize symptoms and athletes' attitudes toward what might happen if they report a concussion (Bramley et al., 2014; Kay, Welch, & Valovich McLeod, 2015; Kroshus et al., 2014; Kroshus, Baugh, Daneshvar, Nowinski, & Cantu, 2015; Kroshus,

Garnett, Baugh, & Calzo, 2015; Kroshus, Garnett, Hawrilenko et al., 2015; Register-Mihalik et al., 2013).

Several quantitative studies have been conducted on concussions and student-athletes over the years. Kay et al. (2015) compared studies conducted by Bramley et al. in 2014, McCrea et al. in 2004, and Register-Mihalik et al. in 2013 on high school students who completed a cross-sectional survey. The main findings of each study consistently demonstrated the need for concussive education for students; the most significant influence on intention to report a concussion was student-athlete attitudes about concussion reporting (Register-Mihalik et al., 2013), having prior concussion knowledge (Bramley et al., 2014), and athletes' perception of that their injury was serious enough to report (McCrea et al., 2004). Kay et al. (2015) pointed out that attitudes affect reporting (Register-Mihalik et al., 2013) and that concussion education would increase the athletes' concussion knowledge, potentially increasing the likelihood they will report symptoms associated with a concussion (Bramley et al., 2014; Hunt, 2015; McCrea et al., 2004). In contrast, some athletes are not aware that they have sustained a concussion and therefore feel that there is nothing to report (Miyashita et al., 2014).

Hunt (2015) conducted a pre- and postintervention survey with high school athletes, using a concussion education video to reiterate the importance of concussion education. She stated, "Education increases an athlete's knowledge of concussions, which has been found to influence the reporting of concussive injuries to medical personnel" (p. 73). Hunt (2015) explained:

> Several reasons have been suggested for this lack of reporting. First, the participants may not think a head injury is sufficiently serious based on teammates' prior head injuries. Second, players may not want to be withheld from competition. Third, players may have

> a lack of knowledge related to the risks and potential consequences of concussion. McCrea et al. concluded that more than one-third of the players who failed to report their injury did not recognize that they had sustained a probable concussion based on their symptoms. When provided with a definition of concussion and description of injury signs and symptoms, the players admitted having sustained a concussion over the course of the football season. (p. 66)

Hiding symptoms to be allowed to continue to play may be a standard of behavior from student-athletes, which demonstrates that they may be unaware or unappreciative of potentially dangerous long-term effects of a concussion (Faure et al., 2015; McCrea et al., 2004), discussed later in this literature review.

In a recent study of student-athletes' attitudes about concussion reporting, the top factors reported by students for not reporting their injuries included being held out of games or practice, not wanting to stop playing or look weak, letting the team down, or hurting the team's performance as a whole (Kroshus et al., 2014).

> The gap between concussions sustained and concussions reported is not simply a function of athletes being unable to recognize problematic symptoms. A growing body of evidence suggests that expectancy value cognitions—what the athlete thinks will happen if they report a concussion and how important those outcomes are to them—are significantly associated with reporting intentions and behavior. Expected reporting outcomes that are most strongly associated with concussion reporting intentions tend to be proximal and relational: beliefs about what teammates would think about their behavior, and how reporting would impact their team's athletic performance. (Kroshus, Garnett, Baugh, & Calzo, 2015, p. 1005)

Davies and Bird (2015) encouraged all athletes to be informed about concussion symptoms and the importance of reporting them immediately. This information should not be shared as a one-time occurrence but repeatedly through concussion education. Concussion education is beginning to be mandated through state legislation and sports-league policies and is aimed at changing and improving concussion reporting behaviors in high school student-athletes (Kroshus et al., 2014). According to Kroshus et al. (2014), "It is critical to consider how psychosocial factors relevant to athletes in their environment constrain their willingness and ability to engage in self-protective reporting behaviors if our goal is to reduce the burden attributable to concussion underreporting" (p. 274).

In a later article, Kroshus, Garnett, Baugh, and Calzo (2015) expressed concerns over whether concussion education's focus on identifying symptoms of a concussion and knowledge about what to do if experiencing symptoms is changing perceptions about reporting concussions. Concerns were also expressed about misperceived team norms and negative impact on individuals if they reported their concussive symptoms. Teams are typically close groups of students. Correcting any misperceived team norms may also lead to better concussion symptom reporting (Kroshus, Garnett, Baugh, & Calzo, 2015).

> If, for example, [if] one wanted to develop an educational strategy that addressed the belief that reporting a concussion means letting the team down, one might provide athletes with specific information about how keeping playing with a concussion can actually hurt the team's performance (Kroshus et al., 2014, p. 273)

Additionally, "correcting the misperceptions and bringing perceive[d] team norms to reflect objective team norms should be associated with an increase of symptom reporting behavior"

(Kroshus, Garnett, Baugh, & Calzo, 2015, p. 1009). With safer perceived team norms, athletes tend to report concussion symptoms (Kroshus, Garnett, Baugh, & Calzo, 2015).

Gender has also been explored in several studies as it pertains to concussion reporting and effects of a concussion. When it comes to concussion reporting and gender, "It is possible that males and females report concussive symptoms differently and this may need to be taken into account when assessing concussion severity" (Chrisman, Rivara, Schiff, Zhou, & Comstock, 2013, p. 6). Results of a more recent study showed that gender might also play a role in recovery and effects of potential subsequent concussions (Wasserman, Bazarian, Mapstone, Block, & van Wijngaarden, 2016).

Symptoms

Symptoms of a concussion are numerous and vary from person to person. The timing of when a person presents symptoms also varies. According to Register-Mihalik et al. (2013), "Concussion is a complicated injury that often does not initially present with obvious signs or symptoms" (p. 878). Kay et al. (2015) recognized that symptoms associated with a concussion are self-reported by the patient. They stated, "One significant issue with identifying concussions is that a clinical diagnosis is based on the presence of signs and symptoms" (Kay et al., 2015, p. 210).

One concern over the symptoms that a concussed person presents with is the fact that the symptoms could be related to other medical issues. Zirkel and Brown (2015) pointed out an ongoing medical debate concerning the nonspecific symptoms presenting in a healthy person that may not be related to a concussion. Another concern is that persistent symptoms may have surfaced from a medical issue that existed before the concussion or underlying psychological issues (Zirkel & Brown, 2015). Many symptoms reported could also "be attributed to other

factors, such as illness, lack of sleep, preoccupation with other issues, or side effects of substances ingested" (Davies & Bird, 2015, p. 103). Symptoms could also be misinterpreted to be associated with attention deficit hyperactivity disorder (ADHD) or anxiety (Davies & Bird, 2015).

As mentioned previously, symptoms do not always present immediately. However, McAvoy (2012) warned that "the simplest physical or mental demand can bring about severe symptoms" (p. 23) following a concussion. Davies and Bird (2015) stated, "Moreover, if symptoms persist, they can lead to long-lasting academic, cognitive, behavioral, and emotional consequences" (p. 103). Students may not recognize their symptoms as being a result of a concussion; "For instance, a soccer player may know she or he is sleeping more than usual and is sensitive to light and noise, but the athlete may not attribute these symptoms to being hit in the head a few days earlier during a soccer game" (Davies & Bird, 2015, p. 103).

DeMatteo et al. (2015) further discussed the negative outcomes after concussion to include "(a) neurocognitive deficits such as memory difficulties and slowed reaction time; (b) postconcussive syndrome, a prolonged recovery of more than 1 to 3 months; and (c) development or exacerbation of depression and/or anxiety" (p. 784). The potential for prolonged recovery is of concern worldwide. According to the World Health Organization (2010),

> The International Classification of Diseases defines PCS as syndrome that occurs following a head trauma sufficiently severe to result in a loss of consciousness and that includes three or more of the following symptoms: headache, dizziness, fatigue, irritability, difficulty in concentration in performing mental task, impairment of memory, insomnia, and reduced tolerance to stress, emotional excitement, or alcohol. (as cited in Zirkel & Brown, 2015, p. 100)

Further research on a postconcussional disorder has been proposed. Criteria would require psychological testing, three or more symptoms in the past three months, and a decline in social, occupational, or academic functioning (Lewandowski & Rieger, 2009).

Although a concussion can be determined to be a mild injury, the symptoms can sometimes last for months (Lewandowski & Rieger, 2009). Symptoms can be physical, cognitive, or emotional (Arbogast et al., 2013; Eisenberg, Meehan, & Mannix, 2014; Gagnon, Swaine, Friedman, & Forget, 2005; Powers, Cinelli, & Kalmar, 2014). Other authors include sleep (Halstead et al., 2010) and behavioral (McAvoy, 2012) in their categories of symptoms. The signs and symptoms of a concussion as reported by students fall into the categories previously mentioned: cognitive, physical, emotional, and sleep (CDC, 2015b). The CDC (2015b) lists other signs and symptoms that are reported by parents or guardians, including an inability to recall events prior to the hit, bump, or fall; behavior or personality changes; forgetting class schedule or assignments. While these symptoms may not be reported by students, they do fall into the main categories mentioned of physical, cognitive, and emotional.

Eisenberg et al. (2014) studies symptoms and their occurrence during recovery. They stated,

> Allowing for overlap between domains and some notable exceptions outlined above, our study shows that the physical symptoms of concussion present early and resolve early after the injury, emotional symptoms develop later than the other domains, and cognitive symptoms impair many patients both immediately after their head trauma and long into the recovery period (Eisenberg et al., 2014, p. 1003).

It is important to know that simple demands, physical or mental, can trigger symptoms to present themselves (McAvoy, 2012).

Physical symptoms. Physical symptoms of a concussion or mTBI experienced by adolescents are self-reported by the injured student-athlete or their parents. Commonly reported symptoms include headache (CDC, 2015b; Choe & Blume, 2016; Davies & Bird, 2015; Gagnon et al., 2005; Ransom et al., 2015; Zirkel & Brown, 2015), nausea or vomiting, and dizziness (CDC, 2015b; Davies & Bird, 2015; Gagnon et al., 2005; Zirkel & Brown, 2015). Other physical symptoms include balance problems, blurry or double vision, sensitivity to light or noise (CDC, 2015b; Davies & Bird, 2015; Zirkel & Brown, 2015), confusion or a feeling of being in a daze (Davies & Bird, 2015; Zirkel & Brown, 2015), fatigue or tiredness (CDC, 2015b; Zirkel & Brown, 2015), and numbness or tingling (CDC, 2015b; Zirkel & Brown, 2015). Not all injured student-athletes suffer from all the symptoms listed here. It is important to be aware of the possibility that these students may experience any number of symptoms that affect academics, as "qualitative reports have illustrated a dynamic process whereby postconcussion symptoms such as headaches, fatigue, impaired concentration, slowed processing speed has the potential to impede academic performance" (Ransom et al., 2015, p. 1044).

The most commonly reported physical symptom is headaches (Choe & Blume, 2016; Eisenberg et al., 2014). These headaches may last for a few days but typically resolve within two weeks (Choe & Blume, 2016). However, some student-athletes suffer from headaches much longer, and in some cases, the headaches may be disabling for the student following the injury (Choe & Blume, 2016). "Risk factors for prolonged recovery and headaches following mild traumatic brain injury likely include female sex, preexisting pain or headache, family history of headache, adolescent age, and depression or anxiety" (Choe & Blume, 2016, p. 83).

Another commonly reported symptom is fatigue (Eisenberg et al., 2014). In a study of the duration of symptoms, "an additional 15.4% of children who did not initially report fatigue

subsequently developed this symptom. A substantial number of children (21.6%) also developed sleep disturbances after their initil evaluation" (Eisenberg et al., 2014, p. 1002). With this percentage of children in this study developing symptoms after the initial injury, is it suggested that children and their parents be warned about the potential of developing these symptoms after the initial injury. Symptoms associated with sleep include drowsiness, sleeping less than usual, sleeping more than usual, and falling asleep (Zirkel & Brown, 2015). Another study indicated that drowsiness could be a predictor of symptoms in high school student-athletes lasting for longer that one week (Chrisman et al., 2013).

One symptom associated with concussion severity is amnesia. However, this relationship was only found to be true for males; the same is not found for females. "It is possible that males and females report concussive symptoms differently and this may need to be taken into account when assessing concussion severity" (Chrisman et al., 2013. p. 6).

Cognitive symptoms. Cognitive symptoms can include, but are not limited to, feeling foggy or hazy, difficulty concentrating, an inability to maintain focus, feeling slowed down, being forgetful of recent information or conversations, repeating questions, and slowness in responses (Daveshvar, Nowinski, McKee, & Cantu, 2011; Davies & Bird, 2015; Halstead et al., 2010; Zirkel & Brown, 2015). These symptoms can occur immediately, impairing an injured person, and last throughout the recovery period (Eisenberg et al., 2014). Chrisman et al. (2013) found that "another cognitive symptom, concentration difficulties, was significantly associated with concussive symptoms [greater than or equal to] 1 week for all athletes" (p. 6). A meta-analysis showed that patients suffering from PCS for three or more months commonly have cognitive problems (Oldenburg et al., 2016).

In a cohort study, Eisenberg et al. (2014) found that cognitive symptoms were experienced by many of the patients involved and developed later in many of the patients who experienced a longer duration of symptoms. Many of these cognitive symptoms averaged resolution within 11 days (Eisenberg et al., 2014). This time frame of recovery would impact a student's academic performance. Although each student responds to a concussion and experiences symptoms differently, there may be a fluctuation between decline and improvement (Davies & Bird, 2015).

McAvoy (2012) provided information on the imbalance of neurochemicals in the brain as it heals itself by balancing these neurochemicals. Davies and Bird (2015) built upon this theory of unstable neurochemicals: "A simple cognitive task like reading or taking a test may cause symptoms to flare. Therefore, when an athlete sustains a concussion, it is important that school personnel realize the possible consequences of concussion on the individual's academic performance" (p. 103). Physical symptoms are much easier to detect than cognitive ones, but the cognitive symptoms could cause an injured student-athlete to experience a decline in school performance and could lead to depression (PopolI et al., 2014). It would be essential for anyone interacting with a person with a concussion to be aware of these types of symptoms and their effects.

Cognitive deficits are of great concern after a student-athlete suffers a concussion. DeMatteo et al. (2015) stated the negative outcomes of a concussion include "(a) neurocognitive deficits such as memory difficulties and slowed reaction time; (b) postconcussive syndrome, a prolonged recovery of more than 1 to 3 months; and (c) development or exacerbation of depression and/or anxiety" (p. 784).

The time following a concussive injury warrants great attention. Although most concussive symptoms resolve within three weeks (Collins, Lovell, Iverson, & Maroon, 2006), "additional cognitive overexertion during this fragile period of neurometabolic imbalance will extend the recovery time" (Zirkel & Brown, 2015, p. 100). Majerske et al. (2008) stated, "athletes who engaged in high levels of activity after a concussion would have higher symptom severity scores and slower recoveries than those who engaged in lower activity levels during recovery" (p. 266). Since student-athletes' primary responsibility is participating in school (Arbogast et al., 2013; DeMatteo et al., 2015), it is vital for the student to be monitored during the time of re-entry into the school setting. The health professional at the school level is the school nurse, who is charged with caring for students returning to the learning environment after a concussion (Zirkel & Brown, 2015). School nurses can monitor the severity of the concussive symptoms of the students, watching for any increase in symptom severity during this time of cognitive exertion (Zirkel & Brown, 2015). Cognitive exertion could lead to symptoms becoming worse, students experiencing learning difficulties, or even more absences from school. "High school students may manifest more significant postinjury school difficulties, given the greater demand for balancing the breadth and depth of the academic curriculum alongside extracurricular activities, in comparison with students in earlier grades" (Ransom et al., 2015, p. 1044).

Rest following a concussive injury is critical in helping the brain to recover from the injury (CDC, 2015b) and alleviating symptoms (Williams, Welch, Parsons, & McLeod, 2015). It is critical for an injured student to return to a baseline cognitive function through cognitive rest immediately following a concussion (CDC, 2015b). The recommendation for rest following a concussion is beginning to be supported by evidence from various studies. It has been reported

that 80% of students who had suffered a concussion and returned to school experienced an increase in symptom severity as they exerted themselves cognitively during the first two weeks following an injury and that poor cognitive tests and increased symptoms were reported when cognitive and physical activities were engaged in during the early postconcussive phase of recovery (Arbogast et al., 2013). Brown et al. (2014) suggested that an extended symptom duration is associated with extensive cognitive exertion and recommended limiting cognitive activities following a concussive injury.

Cognitive rest results in improved symptoms, shortened recovery times, better cognition, and a better sense of well-being (Schneider, 2016). Moser (2012) shared that one week of complete cognitive rest resulted in better cognitive performance and a significant decrease in experienced symptoms (Arbogast et al., 2013). Cognitive and physical rest allows the brain to heal without increasing symptoms. Not increasing symptoms during recovery is essential for high school student-athletes as they recover, requiring modification al all aspects of life in and out of school (Williams et al., 2015). This rest can encompass many aspects of a high school student's life: "In its most extreme form, cognitive rest initially includes no school attendance, no home/school work, no reading, no video games, no texting, no computer time, and for some children in whom it triggers symptoms, no television" (Master et al., 2012, p. 2). Students should keep activity levels low enough to not trigger or exacerbate symptoms. The period of cognitive and physical rest will depend on the length of time it takes for the student to be symptom-free (Arbogast et al., 2013). The concept of rest following a concussion was introduced at the Second International Conference on Concussion in Sport held in Prague in 2004, then reinforced when the Third International Conference on Concussion met in Zurich in 2008 (Arbogast et al., 2013; Brown et al., 2014).

Gagnon, Grilli, Friedman, and Iverson (2015) conducted an extensive review of the literature, identifying the theoretical rationale for rest following a concussion. First, concussions are suspected of causing complex changes to the brain, putting it in a neurometabolic crisis. Second, a concussion can affect an injured person both cognitively and physically as previously discussed. Third, there is a window of vulnerability for reinjury that would magnify the injury results and potentially cause a higher level of trauma. Fourth, statistically, the risk of reinjury is greater during the week that follows the initial injury. Finally, with animal trials, it was shown that if exercise occurred too soon after injury, the recovery process did not go expected (Gagnon et al., 2015).

Oldenburg et al. (2016) conducted a study on the effects of a concussion or mTBI and how they vary among individuals. They proposed that "people with different cognitive abilities may react differently to the same kind of acquired brain injury" (p. 147). Oldenburg et al. (2016) built their study on Satz's theory of brain reserve capacity from 1993, which proposes that individuals have cognitive reserves that act as a buffer when the brain is injured. This study emphasizes the need for further research on cognitive reserves and symptom development. Although several studies have been conducted on the pathological physiology of concussions, there is still disagreement on the precise nature of mTBIs (McNamee, Partridge, & Anderson, 2015).

The research on the brain and its functioning after a concussion have been studied, and the knowledge base is ever growing in this area of medicine. A neuropsychologist, Maryse Lassonde, of Canada worked with a hockey team for 15 years, treating players with concussions. She also evaluated children and young athletes using visual and auditory tasks, along with EEGs

and MRIs. Her research showed that even when a person may no longer be experiencing symptoms, their brain may not have fully recovered ("Sports Concussions," 2013).

In their study on how concussions affect learning, Arbogast et al. (2013) found that "approximately 10% to 18% of concussion patients exhibited school-performance-related symptoms (e.g., concentration difficulties, fatigue, feeling in a fog, and vision problems) and 63% to 85% reported headaches at either initial or follow-up presentation to their PC providers" (p. 400). Their research reveals a connection between brain injury and learning through their examination of the symptoms that students present with following a concussion.

In the area of cognitive functioning, at the University of Nebraska, Dr. Molfese (2015) presented a theory based on how the neural networks of the brain are disrupted after a concussion. Although this theory primarily addresses the functioning of the brain and how a brain learns, it is specific to learning after one suffers a concussion. Molfese (2015) stated, "The level of neural disruption (brain injury) will be inversely related to cognitive processing speed" (p. 4). These cognitive processing speeds relate directly to student learning and the educational environment of student-athletes as they recover from a concussion. Molfese's work demonstrates how the brain processes familiar information differently following an mTBI: "The brain is unable to re-establish the network in the absence of former connections. Instead, it must now engage other areas using different pathways in an attempt to approximate its earlier level of functioning" (Molfese, 2015, p. 7). The brain must use alternate pathways to return to its former level of functioning, which takes more time and is less efficient in processing information (Molfese, 2016).

Molfese (2015) discussed how the brain processes information and acquires information using neural networks to create shortcuts as information becomes more concrete. With this

theory, Molfese further explained predictions that have been created in relation to brain injury. After an injury, the established neural network becomes unstable, reducing the processing of information by the brain. Thus, "Disruptions or alterations in the development of these networks would result in learning problems (e.g., learning disabilities) or result in cognitive impairments following traumatic brain injury (TBI)" (Molfese, 2015, p. 1). The more severe the damage sustained during the concussion, the less accurate and slower responses will be. Recovery requires the brain to create new neural networks to access prior learning and build new networks for new learning. Parts of the damaged network could impede recovery by interfering with newly created networks. According to this theory, accessing prior knowledge will require more time and the development of new networks as new information is learned (Molfese, 2015).

Emotional symptoms. Concussions are difficult to deal with because of the unknown timeline of recovery. Typically, the student-athlete must spend a significant period away from the game, but it is generally unknown when a student-athlete will be able return to play, and the possibility exists that they may not return to the sport (Putukian, 2015). With a visible injury (e.g., sprained ankle or broken arm), there is a way for others to see and witness the recovery process and an experience of positive emotions. A concussion is an invisible injury, and it is less likely that one would experience the feeling of optimism during recovery (Mainwaring, Hutchinson, Camper, & Richards, 2012). "Therefore, coaches, medical professionals, teammates, family members, and all other individuals who interact with a newly concussed athlete should be sensitive to these emotional needs" (Davies & Bird, 2015, p. 104).

Immediately following a concussive injury, patients report physical symptoms such as headaches, dizziness, and fatigue (Eisenberg et al., 2014). Although cognitive symptoms may be present during recovery, emotional symptoms often develop later during recovery (Eisenberg et

al., 2014). These symptoms include "increased irritability, melancholy, heightened emotions, and nervousness" (Davies & Bird, 2015, p. 103) along with "mood disturbances including shock, depression, anger, frustration, anxiety, boredom, reduced self-esteem, fear of re-injury, and uncertainty about the future" (Mainwaring et al., 2012, p. 252). As mentioned previously, postconcussive symptoms can persist for more than a few weeks. It is important that physicians and pediatricians carefully evaluate patients throughout recovery for possible emotional symptoms that are associated with the initial injury and the psychological well-being of the patient (Eisenberg et al., 2014). "Negative outcomes after concussion include (a) neurocognitive deficits such as memory difficulties and slowed reaction time; (b) post-concussive syndrome, a prolonged recovery of more than 1 to 3 months; and (c) development or exacerbation of depression and/or anxiety" (DeMatteo et al., 2015, p. 784)

Although sleep issues and fatigue are typically considered to be somatic symptoms, they have an emotional component as well. Careful attention should be given to children who complain about these symptoms, as they may coincide with emotional symptoms (Eisenberg et al., 2014). Experiencing a combination of these symptoms can make it difficult for an injured student-athlete to complete tasks such as schoolwork (Kroshus, Garnett, Baugh, & Calzo, 2015). With this decline in the ability to complete school work successfully, the likelihood of developing depression increases (Popoli et al., 2014).

Eisenberg et al. (2014) reported while emotional symptoms were not reported immediately following a concussion, they eventually developed in many patients and were some of the symptoms that lasted the longest.

An exception to this was depression, which developed in only 8.6% of patients who did not report it initially. It is unclear whether this reflects the fact that depression itself did

> not develop as frequently as other complaints, or that patients were reticent to endorse depression owing to the stigma associated with this symptom. (Eisenberg et al., 2014, p. 1002–1003)

The injury itself is a stressor for an individual, triggering physical, emotional, and psychological responses (Putukian, 2015). These responses can become problematic if they are persistent, get worse, or are excessive, and an injured athlete could develop "more serious mental health issues including depression, anxiety, eating disorders, [or] substance use" (Putukian, 2015, p. 148). It is unclear if these secondary symptoms are developed because of the pathophysiology component of the concussion or the psychosocial consequences of the unknown length of restrictions placed on children during recovery (Eisenberg et al., 2014). The psychosocial effects of a concussion are sometimes overlooked, and their symptoms "include irritability, anxiety, mood dysregulation, social withdrawal, decreased motivation for once-preferred activities, overwhelmed feelings, easy loss of one's temper, and reduced coping ability for stressful situations" (Lewandowski & Rieger, 2009, p. 100).

Gagnon et al. (2005) conducted a study exploring self-efficacy as it relates to concussed children and their future participation in physical activates. Using self-efficacy, or "people's perception of their competence in dealing with their environment and exercising influence over events that affect their lives" (Miller, 2011), as a lens to study children who had suffered a mTBI, they determined that the children lacked confidence in their ability to perform physical activities after their recovery, suggesting that interventions may impact confidence levels (Gagnon et al., 2005).

Potential effects. The physical, cognitive, and emotional symptoms just discussed in detail appear immediately after suffering a concussion and in the following weeks. There are

also additional potential effects if an injured person experiences repeated concussions. The need is great for coaches and persons involved with student-athletes to be aware of these consequences (McCrory et al., 2013).

There is a current discussion of whether a person who experiences a repeated concussion will have prolonged symptoms during recovery (Eisenberg et al., 2013; Moser, Schatz, & Jordan, 2005; Sarmiento et al., 2010). Most people do recover fully from a concussion, and their symptoms may last from a few minutes to several months (Sarmiento et al., 2010). Symptoms that last longer include issues associated with cognitive functioning like thinking, memory, language, learning, and emotions (Sarmiento et al., 2010). Repeated concussions occurring before the brain has had a chance to recover fully "can slow recovery or increase the likelihood of having long-term problems. In rare cases, repeat concussions can result in swelling of the brain, permanent brain damage, and even death" (Sarmiento et al., 2010, p. 113).

Eisenberg et al. (2013) investigated several studies that explored the association between prior concussions and symptoms. They reported that Moser et al. (2005) examined the relationship between previous concussions and prolonged symptom duration. Student-athletes with multiple prior concussions "had persistent neurocognitive deficits indistinguishable from those in the acute recovery phase of concussion" (Eisenberg et al., 2013, p. 9). Eisenberg et al. (2013) further shared that two larger studies did not find an association between the duration of symptoms and prior experienced concussions, contradicting findings from their research:

> Our study demonstrates that previous concussion is predictive of a longer time to symptom resolution after pediatric concussion. Importantly, we found that the effect of previous concussion on symptom duration was strongly influenced by both the number of previous concussions and the time elapsed since the most recent previous concussion.

> Both study participants with multiple previous concussions and those who had sustained a concussion within the previous year had a markedly greater duration of symptoms than those with no previous concussion. (Eisenberg et al., 2013, p. 8)

Their conclusion suggests that children who have had recent or multiple concussions are at risk for experiencing symptoms for a more extended period of time (Eisenberg et al., 2013).

Student-athletes who have recently suffered a concussion and experience a second concussion before recovery from the first may experience Second Impact Syndrome (SIS), which can cause permanent brain damage or death (Davies & Bird, 2015). Among the 300,000 sports-related concussions each year, SIS has been the cause of 30–40 deaths in the past decade (McDaniel & McIntire, 2010). The following describes what can happen as a result of suffering a second impact following a concussion:

> In a 1984 case report, Saunders and Harbaugh (1984) described the death of a college football player who was still suffering from mild symptoms of a concussion when he returned to football. Although he sustained no significant head trauma, he collapsed during practice, and despite heroic efforts to save his life, subsequently died. The authors hypothesized that, in the setting of incomplete recovery from a concussion, an additional relatively mild injury might precipitate cerebral edema. Along with an associated increase in intracranial pressure, cerebral herniation, and death, a physiologic process termed second impact syndrome. (Hanson, Stracciolini, Mannix, & Meehan, 2014, p. 1221)

Several researchers provided description of what happens with the brain following a second impact while still concussed. Halstead et al. (2010) stated, “Second-impact syndrome results in cerebral vascular congestion, which often can progress to diffuse cerebral swelling and

death" (p. 606). Additionally, Davies and Bird indicated that SIS "results in a swelling of the cerebral cortex of the brain and can cause permanent impairment or even death" (2015, p. 104).

SIS can be prevented. Once an athlete has suffered a concussion, he should be removed from playing the sport. While athletes are still experiencing symptoms, they should not be allowed to return to the playing field (Hanson et al., 2014; Kroshus, Garnett, Baugh, & Calzo, 2015; Meehan, d'Hemecourt, Collins, & Comstock, 2011). SIS is not the only long-term effect of concern: "Athletes who sustain multiple concussive injuries or perhaps multiple sub-concussive blows to the head during their athletic careers may be at risk for long-term dementia and other potential problems such as chronic traumatic encephalopathy" (Meehan et al., 2011, p. 2304).

Chronic traumatic encephalopathy, according to Gavett, Stern, and McKee, is a disease that occurs long after recovery from a concussion (as cited in Davies & Bird, 2015). It is a neurodegenerative disease that is only diagnosed with an autopsy, and to date, there is no tool for diagnosis to use with a living person (Davies & Bird, 2015). As the number of concussions increases throughout a player's career, the chance of developing this or other neurodegenerative conditions such as depression or Alzheimer's increases (Kroshus, Garnett, Baugh, & Calzo, 2015). Lassonde, a researcher in Canada, did a study on older athletes that had sustained their last concussion at least 30 years ago and compared them to healthy people in their age range. Her findings showed "those who had suffered a head trauma had memory and attention deficits and motor problems similar to the early symptoms of Parkinson's disease" and that "further testing of these older athletes turned up a thinning of the cortex in the same regions of the brain that Alzheimer's disease usually affects" ("Sports Concussions," 2013, p. 20). Creating profiles of injured athletes has allowed researchers to create a list of common symptoms that possibly

demonstrate the first signs of chronic traumatic encephalopathy. These include "increased anger, suicidality, poor episodic memory, and weakened executive functioning skills. As the disease progresses, individuals may have decreased movement and speech difficulties" (Davies & Bird, 2015, p. 104).

In the majority of people who suffer a concussion, the prognosis is good (Oldenburg et al., 2016). It is essential to understand what symptoms may occur and the progression as mentioned previously. This knowledge of symptoms could potentially alleviate additional stress that one might have from worrying about symptoms that they are experiencing, or to an extent, normalize the experience (Eisenberg et al., 2014).

Recovery

As with any injury, recovery time will vary from person to person. Davis and Purcell (2014) stated that, in general, adults recover faster than children from a concussion with both their symptoms and neurocognitive recovery. "On an average, concussed high school athletes take twice as long to recover (10–14 days) than college and professional athletes (3–7 days)" (Davis & Purcell, 2014, p. 98). A review by King (2014) proposed that approximately 20% of patients suffering a mild head injury do have symptoms beyond the recovery time of three months that the majority of concussions fall within. "Evidence suggests, however, that the effects of concussion are not limited to the clinically symptomatic period, which typically lasts less than two weeks. Studies show cognitive deficits in child and adolescent athletes can persist for up to 3 years" (Johnson, 2012, p. 182). Just as recovery can vary from person to person, it can also be different from concussion to concussion in the same person (Santiago, 2016).

Recovery management. Brown et al. (2014) conducted a study on concussed students between the ages of eight and 23. In this study, they discussed what is needed to consider an injured person to be out of recovery:

> Athletes were considered recovered when (1) they were symptom-free at rest, (2) they were symptom-free with exertion and after discontinuing medications prescribed for post-concussion symptoms, (3) their balance error symptom scores were back to baseline, when available, and (4) their computerized neurocognitive test scores were at or above baseline values, when available. (Brown et al., 2014, p. e300)

Assisting students in navigating the road out of recovery can be difficult, as each concussion is different (Santiago, 2016) and no standard time frame for recovery can be established.

Once diagnosed, patients of all ages should be given a period of cognitive and physical rest (Davis & Purcell, 2014), which helps reduce the symptoms experienced. Cognitive rest allows students' brain to recover (Williams et al., 2015) more quickly when they are not experiencing the cognitive demands of schoolwork (McGrath, 2010). The period needed for cognitive rest varies and needs to be managed individually for each student (DeMatteo et al., 2015; Schneider, 2016). Rest should occur until the child no longer has symptoms at rest, then a graduated plan should be developed as the child regains full recovery. Cognitive rest includes limiting activities that require concentration: watching television, playing games, using computers and phones, and reading (Davis & Purcell, 2014).

School is the primary job in life for high school students, and extended time away from school can be seen "as a significant barrier to the implementation of cognitive rest as a plan" (Master et al., 2012, p. 2). DeMatteo et al. (2015) expressed concern over the disadvantages for students being out of school for an extended time, stating that this time away may affect

"academic standing, [cause] social isolation, and may contribute to depression and /or anxiety" (DeMatteo et al., 2015, pp. 783–784). Once back at school, continued symptoms could interfere with academic work, participation, and interactions with peers (DeMatteo et al., 2015). Other adverse effects could include anxiety about missing schoolwork and separation from friends (Popoli et al., 2014).

Recovery time. The typical recovery times vary from zero to 13 days from the time that the concussion was sustained (Popoli et al., 2014). The symptoms of a concussion usually resolve within a two-week period (Choe & Blume, 2016; Eisenberg et al., 2014; Kroshus, Garnett, Baugh, & Calzo, 2015). With the concern over anxiety and social consequences, it is recommended that students should return to school without exacerbating symptoms (Popoli et al., 2014). When symptoms last longer than one week, it could be an indication of a more severe injury (Chrisman et al., 2013).

Popoli et al. (2014) identified a subchronic recovery as one lasting 14–28 days. "More than 10 days has been suggested as a prolonged recovery time, although younger students may take longer" (Baker et al., 2015, p. 961). Taking this length of time to recover from a concussion is a cause for concern. Students who play sports may be put back into play too soon and potentially suffer a greater severity of injury (Chrisman et al., 2013). As mentioned in the discussion on symptoms, somatic and emotional symptoms may develop during this time (Chrisman et al., 2013; Eisenberg et al., 2014) that could affect students' ability to complete schoolwork (Kroshus, Garnett, Baugh, & Calzo, 2015).

The chronic recovery is longer than 28 days (Popoli et al., 2014). The length of recovery for children ranges widely, according to Eisenberg et al. (2014):

> Estimates as to duration of post concussive symptoms in children range widely, with reports showing as few as 10% of patients symptomatic 7 days after sport related concussion to as many as 43% still with symptoms 3 months after being hospitalized for mTBI. One cohort study conducted in the emergency department (ED) setting showed 29.3% of children aged 5 to 18 years still symptomatic 3 months after sustaining a concussion, with the most common symptoms being headache, fatigue, and frustration. Another study of children 18 years and younger demonstrated that 11% of patients who had a concussion were symptomatic at the 3-month mark, with fatigue, emotional lability, and irritability being the most common enduring symptoms. (Eisenberg et al., 2014, p. 1000)

It is unknown what factors lead to prolonged symptoms for a person who has suffered a concussion (Eisenberg et al., 2013). Headline Science (2013) reported that a researcher in Canada is demonstrating that for two years following a concussion, young athletes still experience abnormal brain waves. A student experiencing this type of recovery will need to have academic accommodations in place or consider a homebound education (Popoli et al., 2014).

Students who have had a previous concussion have a higher chance of suffering prolonged symptoms if concussed again (Eisenberg et al., 2013). A student who suffers another concussion before recovering from the first one has a more significant potential of increasing their recovery time, developing long-term issues, or even suffering permanent brain damage (Sarmiento et al., 2010). However, other studies with high school athletes "found no association between previous concussion and duration of post concussive symptoms" (Eisenberg et al., 2013).

Quality of life. Treatments and rehabilitation services have no evidence-based guidelines for students who suffer from prolonged symptoms following a concussion (Gagnon et al., 2015). "There is a critical need to develop, implement, and evaluate treatment and rehabilitation strategies for these patients" (Gagnon et al., 2015, p. 303), improving their health-related quality of life (HRQoL). The patients' perspective of the outcome of their health is referred to as HRQoL (Pieper & Garvan, 2014). Two studies directly discuss HRQoL in students with a concussion. Pieper and Garvan (2014) used HRQoL scales to survey three groups of 40 students about their quality of life at three-month intervals through one year after their concussion, citing the need for further study. By evaluating students who do suffer beyond the typical recover with HRQoL, new goals can be set to address the physical, mental, and social well-being of patients who have suffered a concussion (Pieper & Garvan, 2014).

Iadevaia, Roiger, and Zwart (2015) conducted a qualitative study on seven students who had suffered a concussion. Their study included perspectives of concussed adolescents and their parents at one year postinjury. Their foundation questions were based on adolescent student-athletes' physical function, emotions, interpersonal relationships, and academic performance (Iadevaia et al., 2015). While the study indicated that the concussion effected them in all areas studied, the study did not include perceptions of friends, teachers, or any other faculty and staff associated with the students.

There has been much research conducted on concussions over the past decade, but there is a lack of development in a recovery route and interventions to facilitate during recovery (Molfese, 2015). Future studies should seek to identify factors that may lead to a higher risk of postconcussive symptoms and identify patients who may be at risk for developing them

(Oldenburg et al., 2016). More research is much needed on recovery from a concussion or mTBI.

Return to Activities

A sensible approach to managing recovery includes a plan for a student to gradually return to activities without exacerbating symptoms (Gagnon et al., 2015). Master et al. (2012) stated that cognitive and physical rest is needed before a return to activities plan should be developed. This plan includes a return to the learning environment and the return to the playing field. The primary responsibility of adolescents is school (DeMatteo et al., 2015). Many adults do not hold to this perspective, as many times their first desire is to see the child "back in the game."

Return to play. In a study by Chinn and Porter (2013), themes emerged as the study progressed concerning community college students' RTP. First, an "old-school" coach may just want the player to work through the injury because it is a part of the sport. Another theme that emerged was that of players not reporting or underreporting symptoms because they wanted to play. "'Normal' outward appearance of athletes following concussion—coupled with a tendency to deny their symptoms in order to be returned to play—can mask a potentially life-threatening injury" (Chinn & Porter, 2013, p. 410).

Literature looks at the premature RTP, the potentially fatal outcome of a subsequent concussion (Carson et al., 2014), and how general guidelines may not fit all concussed athletes (Johnson, 2012). RTP guidelines have been put into place by several states after Washington State implemented the Lystedt Law. The law is named for a teen who suffered a concussion and returned to the same game only to be injured again. He became permanently disabled after the second concussion, also known as SIS (Chinn & Porter, 2013). "Investigators have reported that

a history of concussive injury is associated with an elevated risk for additional concussion" (McGrath et al., 2013, p. 112). Some states have implemented a RTP protocol, and other states only require training for coaches and athletic trainers on concussions without the RTP protocol. However, according to Davis and Purcell (2014), "No paediatric athlete who has sustained a concussion should be allowed to return to play that same day" (p. 100). Other studies confirm that students should not return to play on the same day (Chinn & Porter, 2013) or until asymptomatic at rest (Halstead et al., 2013).

When developing RTP guidelines, Chrisman et al. (2013) suggested the assesssment of symptoms at one week to better inform guidelines to implement. Athletes who return to play before symptoms resolve are at risk for SIS, and athletes who sustain multiple concussions may be at risk for long-term effects (Meehan et al., 2011). To prevent returning a player to the playing field too soon, computer programs can be used to diagnose a concussion and monitor progress during recovery to know when it is safe for the athlete to return to the playing field (McDaniel & McIntire, 2010).

Return to learn. Returning to the learning environment has not been a priority, as compared to returning to the playing field, for concussed student-athletes. The 2008 International Conference on Concussion in Sport consensus statement's RTP protocol gave a specific six-step plan to increase a student's level of physical activity, but "the advice for return to learn (RTL) was problematically vague" (Carson et al., 2014, p. e312). Research on returning to play has been rapidly expanding, but RTL has not received the same attention (Baker et al., 2015). Much of the attention regarding concussions has come from professional athletes who play a sport for a living, and not much attention has been given to student-athletes, whose

primary job is to go to school (Master et al., 2012). It is important to remember that "children are students first and athletes second" (DeMatteo et al., 2015, p. 784).

In an abstraction and review of medical records, Arbogast et al. (2013) discovered that approximately 50% of children who were seen for a concussion received instructions on RTP. However, the RTL guidelines had not been distributed to patients as widely. Concussion management primarily focuses on returning the student to a sport or activity, not to the classroom (DeMatteo et al., 2015). This priority needs to change. Student-athletes are students first, then athletes, making RTL more important than RTP (Arbogast et al., 2013; Davis & Purcell, 2014; DeMatteo et al., 2015; McAvoy, 2012).

Protocols for RTP have been established and outlined by International Conferences on Concussion in Sport and the American Academy of Neurology. No standard protocol for RTL has been developed by an expert consensus. Currently, a self-guided, stepped RTL protocol is being provided to guide parents (Ransom et al., 2015). The physicians presenting this protocol need to be trained in concussion management with an understanding of the demands that school places on students, working in partnership with the school on a RTL plan (Gioia, 2016). "It is imperative that any standardized protocol of postinjury academic recommendations is predicated on an empirically based understanding of the academic effects of concussion, not just speculation" (Ransom et al., 2015, p. 1044).

In some cases, students are not able to return to school due to the severity of symptoms they are experiencing. Many times, students return to school while still experiencing symptoms such as headaches, fatigue, concentration issues, and memory issues. As mentioned previously, concussion symptoms are mostly invisible yet significantly affect students' academic work (Lewandowski, 2009). Without the much-needed cognitive rest, more than 80% of students will

experience an increase in symptom severity within the first two weeks of returning to school (Arbogast et al., 2013; DeMatteo et al., 2015), potentially prolonging recovery and running the risk of another injury (DeMatteo et al., 2015). "The first priority for children and adolescents recovering from concussion is return to baseline cognitive function, which is achieved through immediate cognitive rest" (Arbogast et al., 2013, p. 401).

Although there is some debate over cognitive rest, there is a need for parents, physicians, and educators to have clear recommendations for a student returning to school. These recommendations should allow for participation in school activities, both social and academic, without exacerbating symptoms, allowing a student to return to a regular routine and gain social support, although the typical school day may be modified (DeMatteo et al., 2015). "An important difference exists between returning to school and returning to learn" (DeMatteo et al., 2015, p. 784). Because concussions vary from person to person, the return to school would be individualized and symptom-driven (DeMatteo et al., 2015).

Student Support

Whenever a student is away from school for an extended a period of time, some level of support is needed as the student returns to the classroom and catches up on any missed work. "A smooth reentry into school following any medical issue is critically important for the student given its central importance in their life" (Gioia, 2016, p. 94). It is important for educators to understand how a concussion affects students as they return to the classroom (Faure et al., 2015). "The main occupation of childhood is participation at school, which is vital to social development, academic learning and preparation for future roles" (DeMatteo et al., 2015, p. 783).

With school the primary occupation of a student (Master et al., 2012), it is possible that students will attend school even though they are still experiencing symptoms of a concussion (Lewandowski & Rieger, 2009). Areas related to the school setting that could be affected by a concussion would be short- and long-term memory, processing skills, (Faure et al., 2015), computer work, and visual stimulation (Williams et al., 2015).

Going back to school following a concussion requires a partnership among the family, healthcare provider, and school (Gioia, 2016; McAvoy, 2012). McAvoy (2012) recommended that a concussed student return to school with the partnership between the health provider and school formed and permissions granted to allow for two-way communication. It is important that health-care providers understand that concussion knowledge and management may vary from school to school, and the RTL process may vary between patients (Heyer, Weber, Rose, Perkins, & Schmittauer, 2015). In most cases, there will a need for modifications for the student to manage the school day (Faure et al., 2015; Heyer et al., 2015). Master et al. (2012) recommended a concussion care plan "to help the patient and family comply" (p. 2).

Concussions' effect on attendance has been addressed in some articles. Arbogast et al. (2013) reported that only 30% of children's attendance and performance were affected by postconcussive symptoms.

> Most students did not miss any days of school or returned to school within several days after their concussion and were likely symptomatic. Of the 79 students with available "days missed" data, 48 students did not miss any days, 18 students missed 1 to 3 days, and 13 students missed 4 to 21 days of school. (Baker et al., 2015, p. 965)

Yet, attending school may prevent a student from receiving the cognitive rest needed to recover from a concussion (Master et al., 2012).

Effects of missing school can be seen in a drop in grades and potentially extend beyond the initial recovery period, possibly affecting graduation, application to college (Johnson, 2012), and academic standing (DeMatteo et al., 2015). Other effects include social isolation and the possibility of developing depression or anxiety (DeMatteo et al., 2015). Baker et al. (2015) interviewed students and parents about the students' concussion. In these interviews, they did not "evaluate the length of time for which school problems persisted or the implication of the problems for student progress or social life" (Baker et al., 2015, p. 967), indicating a possible area for future research.

School team. When it comes to concussion management, an educational team could provide the needed adjustments and accommodations to support a student returning to school following a concussion (Davies, 2016; McAvoy, 2012). This collaborative team would ideally be composed of many individuals who could provide support for students, including the student, parents, caregivers, physician, school nurse, teacher, school psychologist, school administrator, and possibly an occupational therapist, speech therapist, and physical therapist (Davies, 2016). Popoli et al. (2014) recommended families request a meeting with teachers and administrators to discuss the possibility of holding a student support team meeting to discuss academic accommodations as recommended by the healthcare provider. This informal meeting would be the first step in addressing the needs of the students, and if long-term accommodations are needed, a 504 plan can be developed (Popoli et al., 2014). Interestingly, the articles suggesting the members for the education team (Davies, 2016: McAvoy, 2012) leave the position of the athletic director, coach, or athletic trainer off the list. This suggestion contrasts with a study by Williams et al. (2015) that indicates that many of the stakeholders in a secondary school should

be a member of the academic support team of a concussed student, including the previously mentioned positions.

Coaches and athletic trainers are the first to interact with an injured student to determine the extent of injury from the field of play (Meehan et al., 2011). According to Faure et al. (2015), "Athletic trainers have been shown to be highly qualified in identifying concussions and in injury management" (p. 6). Many of them attribute the increase in the number of concussions reported at their school to the passage of concussion laws in their state (Faure et al., 2015). With the new laws, new training is required of the athletic trainers. (Faure et al., 2015; McGrath, 2010). In a study by Kasamatsu, Cleary, Bennett, Howard, and McLeod (2016), it was determined that approximately 84% of the athletic trainers surveyed "recommended a gradual return to learn" and approximately 44% "reported having a return-to-play policy" (p. 155).

> Of the 15.9% (173/1088) of ATs who did not provide return-to-learn recommendations, the rationales for not making these recommendations were lack of school professionals' understanding of concussions, lack of school support, lack of time to monitor academics, lack of time to develop the return-to-learn policy, academic expectation of the school, no previous cases of delayed recovery, or not being part of the AT's responsibility" (Kasamatsu et al., 2016, p. 155-156).

This study demonstrates how varied responses are to a student's academics after a concussion.

Another member of the school personnel to be involved with a student's recovery from a concussion is the school nurse. School nurses understand concussions and are in a position to assist in monitoring symptoms (Zirkel & Brown, 2015) and be an advocate for the concussed student (Wing, Amanullah, Jacobs, Clark, & Merritt, 2016). School nurses are an essential

support to any concussed student and therefore should be included on any RTL team (McAvoy, 2012; Schneider, 2016, Wing et al., 2016; Zirkel & Brown, 2015).

School counselors and school psychologists can assist a student who is returning to the learning environment following a concussion (McAvoy, 2012). School psychologists are in the position to evaluate and assess the academic needs of any student returning following a concussive injury. They may also conduct any psychoeducational testing to identiy cognitive problems for the student (Lewandowski & Rieger, 2009). Along with testing, monitoring would be necessary to assist in determining if any IEP should be developed for implementation. Davies (2016) suggested that a school psychologist involved with a concussed student's RTL have specialized training dealing with TBIs and concussions. "A school psychologist with special expertise in TBI can also effectively consult with families, school teams, coaches, and medical providers; plan transitions from the hospital or rehabilitation center; conduct evaluations; and design and monitor interventions" (Davies, 2016, p. 570).

Although educators are vital to a successful RTL, they "are the newest team members to come to the table on concussion. The experts in concussion management know now that they cannot thoroughly treat the athlete unless they also treat the student" (McAvoy, 2012, p. 25). Teachers spend several hours with students daily during the school year (Davies, Sandland, & Lopez, 2016), allowing them to potentially identify any changes in the student as a result of the concussion. Concussions are an invisible injury. Even if a student looks fine on the outside, he or she could be experiencing cognitive, behavioral, and emotional symptoms because of the concussion (CDC, 2015a; Davies et al., 2016; Jantz & Coulter, 2007).

Many educators are not trained to understand concussions and their effects on the brain (DeMatteo et al., 2015). Teachers understanding that students may have many symptoms that

interfere with learning new material (McAvoy, 2012) and quickly retrieving learned information (Molfese, 2015) is paramount to a student's success. Educators need to be prepared to "assess – intervene – monitor progress – adjust repeats until the student is recovered from the concussion" (McAvoy, 2012, p. 25), which is typically in one to three weeks. Hachem, Kourtis, Mylabathula, and Tator (2016) stated that "there should be mandatory concussion training for all staff to understand the signs and symptoms of a concussion and the potential post-recovery time. This includes all teachers and administration staff" (p. 559). Carzoo, Young, Pommering, and Cuff (2015) and Zirkel and Brown (2015) both encouraged school districts to provide staff development on concussion recognition to improve the educational environment for the student.

Academic effects. The effects of a concussion on academics constitute a significant concern when concussed students are returning to the classroom. "When an athlete sustains a concussion, it is important that school personnel realize the possible consequences of concussion on the individual's academic performance" (Davies & Bird, 2015, p. 103). High school students are responsible for balancing a heavier academic load than previously experienced in earlier grades, along with extracurricular activities (Ransom et al., 2015). Students who lose a significant amount of time in school due to a concussion run the risk of their grades suffering beyond the recovery period, affecting plans for graduation and college (Johnson, 2012). Beyond grades, students may also be affected emotionally, suffering "a loss of competence and self-worth, as well as anxiety about homework and school success" (DeMatteo et al., 2015, p. 788).

The symptoms discussed earlier in this literature review have the possibility of creating various effects on academics. "Even the simplest cognitive task like reading or taking a test may cause symptoms to flare" (Davies & Bird, 2015, p. 104). Following a concussion, academic performance is affected by symptoms being experienced, which are exacerbated by demands

placed on the student (Lewandowski & Rieger, 2009). Ransom et al. (2015) conducted a study on the effects of a concussion on academics and recommended targeted supports to be put in place during the recovery period. "Our findings suggest that these supports are particularly necessary for older students, who face greater academic demands relative to younger peers" (Ransom et al., 2015, p. 1049). Williams et al. (2015) suggested the use of an academic management plan to implement for the concussed student with input from "all school personnel who may interact with that student-athlete on a regular basis" (p. 266). Even the strongest academic students may find their symptoms create difficulty in the classroom (Faure, 2010), and it is vital for them to return to the classroom with the appropriate modifications (DeMatteo et al., 2015).

Adjustments in the school schedule and workload need to be considered for concussed students. And once the changes are made, the team may need to make modifications or adjustments "similarly to how they might if being asked by a doctor to watch and adjust for a student during a medication change" (McAvoy, 2012, p. 25). These adjustments or accommodations could include, but are not limited to, adjustments to the length of the school day, scheduled periods of rest throughout the day, a reduction in the amount of work, access to printed notes, the opportunity to audit class lectures, extended time for tests, use of sunglasses or earphones for light and noise sensitivity, and permission to leave the classroom and check in with the school nurse as needed (Master et al., 2012; McAvoy, 2012; McGrath, 2010; Popoli et al., 2014).

Most concussions do resolve without problems (McAvoy, 2012), but up to 30% of concussed students have reported effects on attendance and school performance (DeMatteo et al., 2015). Academic accommodations for students who have sustained a concussion vary between

states and even school districts, with some areas strictly following physicians' orders to others implementing a 504 or IEP (Popoli et al., 2014). "This inconsistency makes it more challenging for students to successfully return to school after a concussion" (Popoli et al., 2014, p. 217). Students who continue to have symptoms 14 to 28 days (subchronic) past their injury should have modifications or accommodations in place. A meeting should be requested by the family to either review accommodations that are in place or discuss accommodations that are needed to prevent long-term academic issues (Popoli et al., 2014). If a student is symptomatic beyond the 28-day (chronic) mark, then steps, including possible neurological testing, need to be taken to consider the possibility of additional diagnoses and additional accommodations, including the potential of a homebound option (Popoli et al., 2014).

Three options of more targeted accommodations include an individualized health plan, a 504 plan, or an IEP (Halstead et al., 2013; Williams et al., 2015; Zirkel & Brown, 2015). An individualized health plan is a less formal way to create suitable accommodations or adjustments for a student returning to school from a concussion, and the school nurse can assist in implementing this plan. This option is less data-driven than a 504 plan or an IEP (Zirkel & Brown, 2015).

A 504 plan is derived from the 504 section of the Rehabilitation Act of 1973, which ensures any student with a disability the right to participate in school with their peers (Popoli et al., 2014; Williams et al., 2015; Zirkel & Brown, 2015). "Section 504 defines a person with a disability as having a physical or mental impairment that limits one or more major life activities, having a record of such an impairment, or being regarded as having an impairment" (Popoli et al., 2014, p. 219–220). A 504 would be an option for a student who is experiencing academic

difficulties and has a medical history of learning challenges such as attention deficit disorder, ADHD, or a documented learning disability (Popoli et al., 2014).

The third option mentioned here is the IEP. This plan for academic accommodations is a formal document that "stems from the Individuals with Disability Education Act of 2004" (Popoli et al., 2014, p. 220). The IEP is based on a federal statute that ensures students free and appropriate education to include supplemental services for students with disabilities (Popoli et al., 2014; Zirkel & Brown, 2015). An IEP is a legal document that requires a student to undergo extensive testing and evaluations that may take eight weeks or more to complete and implement for the student (Popoli et al., 2014). Only three states have laws requiring schools to implement accommodations for students following a concussion (Zirkel & Brown, 2015).

Concussion knowledge among students. One concern at the school level is the reporting of a sustained concussion, with students fearing an adverse outcome if they do report the incident or concussive symptoms to their coach. They may fear the loss of their position on the team (Kroshus, Baugh, Daneshvar, et al., 2015). "One commonly proposed strategy to reduce underreporting has been to educate athletes about concussions" (Kroshus et al., 2014, p. 270). Many times, it is up to the coach to reassure students that if they are injured that they will have an opportunity to regain their former position (Kroshus et al., 2014).

Concussion educational interventions have been developed in recent years to provide basic knowledge to students on how to "correctly identify concussion signs and symptoms and improve their reporting of concussion" (Hunt, 2015, pp. 71–72). Although this education for students may be helpful in the identification of symptoms related to a concussion, it may not change the reporting behavior of injured students (Kroshus, Garnett, Baugh, & Calzo, 2015). Improving concussion education for students will require the incorporation of input from sources

such as clinicians, who can give a perspective on the symptoms and possible outcomes of an unreported concussion along with what actions an athlete can take to reduce the risk of concussions (Kroshus & Baugh, 2016).

Concussion Laws

The first law concerning concussions was the Zachery Lystedt Law passed in 2009 in the state of Washington (Doheny, 2014; Underwood, 2016). In 2006, Zachery Lystedt was a 13-year-old playing football who was tackled and sustained a concussion and continued playing in the game. At the end of the game, he collapsed and was airlifted to the hospital where "he spent 2 months in a coma, 7 days on life support, and 93 days in the hospital" (Doheny, 2014, p. 1). Zachery's incident inspired the state of Washington to pass this law. After this law was passed, the state of Oregon passed a bill to include guidelines for concussion management (Underwood, 2016). According to Zirkel and Brown (2015), 49 states and Washington, DC, have passed RTP concussion laws with only three states requiring classroom accommodations. The RTP component requires concussion information to be given to parents and students, the removal of the student from play if a concussion is suspected, and an evaluation by a healthcare provider before the athlete is allowed to return to play (Faure et al., 2015).

Summary

The literature presented here primarily addresses the medical aspect of a concussion. Many symptoms are discussed along with the potential for severe or fatal injury when athletes return to play too soon. Many of the medical articles suggest that accommodations be made for a student recovering from a concussion, but no specifics are offered to educators through educational channels. Empirical journal articles on how students cope with returning to the educational environment are missing.

There is a great need for educational research to be conducted in schools with students, faculty, and staff. Many of the studies covered in this review cited the need for further research on student-athletes with concussions. A study conducted in New Zealand concluded, "A significant absence identified in the literature is that of children's functioning in school setting after mTBI" (Case, 2014, p. 34). Kasamatsu (2014) noted, "School professionals' knowledge of and perceptions towards concussion and academic accommodations should also be explored" (p. 156). "It is essential for all adults working with the student to understand the effects of a concussion on learning and how best to reduce cognitive demands during this period of recovery" (Halstead et al., 2013, p. 952). This need for educators understanding was echoed by Rosenthal's (2012) study on the effects of TBIs on students. She stated that future research should include a narrowing of the focus of a study to student-athletes, with emphasis on re-entry to the classroom. Additionally, further research should include the teacher's perceptions on how students with concussions may need academic accommodations, students' perceptions on their own re-entry to the classroom, and friends and classmates' perceptions.

The need for further research on students and concussions is evident. The literature review presented here supports the need for a qualitative study to bring needed information to understand better how student-athletes cope as they return to the academic environment at a high school level by including input from students, teachers, friends, and classmates.

CHAPTER THREE: METHODS

Overview

This chapter will detail specific procedures this study, including why an instrumental case study is most appropriate to address a real-life issue applicable to today's society (Yin, 2009). This instrumental case study centers on a high school student who has suffered a concussion and is experiencing symptoms beyond the typical two- to three-week recovery time (Choe & Blume, 2016; Collins et al., 2006; Eisenberg et al., 2014; Kroshus, Garnett, Baugh, & Calzo, 2015; Popoli et al., 2014). The subject of concussions has been of great interest in recent years to the public. The purpose of this study was to discover and better understand how a high school student copes academically when returning to the school environment after suffering a concussion. This chapter provides descriptions of the setting, participants, procedures, researcher's role, data collection, data analysis, trustworthiness and ethical considerations.

Design

This project was conducted as a qualitative instrumental case study. Time and place bind a case study, allowing the collection of accurate, recent, in-depth data. Creswell (2013) stated that a case study is a type of design, in qualitative research, which may be an object of study as well as a product of the inquiry. Yin (2014) described a case study as "an empirical inquiry that investigates a contemporary phenomenon in depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident" (p. 16). This study was designed to gain rich, in-depth data of how a concussed student copes academically in the school environment following a concussion.

To gain rich, in-depth data, guidelines for an instrumental case study were followed. This case study consisted of a single case with unusual circumstances, "deviating from

theoretical norms or everyday occurrence" (Yin, 2014, p. 52). When selecting a case for a case study, Patton (2015) suggested selecting a case that is relevant to the focus of the study, offers some diversity, and provides more complexity and context to the study. According to Stake (1995), the basis of an instrumental case is "an issue question that is of more interest to the researcher than is the case" (p. 18). The issues of what it is like for a student to return to the classroom following a concussion was the primary focus of the case study presented here.

For this study, I sought out an unusual case at a single location. The case was a student who had suffered a concussion and was experiencing symptoms beyond the typical recovery period. Halstead et al. (2013) stated that recovery occurs within three weeks for school-aged children, and King (2014) reported that as many as 20% of those injured are symptomatic at three months postinjury. The concussed student was the primary participant in the study, while the people surrounding her were secondary participants who have a direct connection to the primary participant. This secondary group adds much sought-after data from multiple sources to add understanding to the complexity of the case.

For an exemplary case study, Yin (2014) suggested finding a significant case to study. This case is unusual and addresses a nationally significant issue. With concussions and their effects on athletes being in the news in the past few years, this topic seems to be of national public interest. As the literature review indicated, this group of high school student-athletes deserves more attention and research. A good case study must be complete, according to Yin (2014). To create completeness, the researcher must pay attention to the boundaries of the case, the collection of all relevant data to the case, and the exhaustion of all possible sources of data collection. The case does not end because of time constraints; it ends when all the relevant data collection is complete. The researcher must explore all alternative perspectives. The researcher

must objectively report data, present evidence judiciously and effectively, and engage the audience for which the research is intended (Yin, 2014).

By following the design of a case study, it is possible to conduct a thorough, in-depth investigation of a student who has suffered a concussion and to add empirical knowledge on what is it like for a student to return to the classroom as he or she recovers from a concussion. The issues and needs that emerge add more knowledge and understanding on concussed students as they return to the classroom, addressing needs that may arise academically, physically, emotionally, and socially.

Research Questions

The basis of the primary research questions guiding this study is the gaps in the literature from previous studies. The most significant gap in the research is the lack of empirical, educational studies conducted on concussions and student-athletes' return to the classroom. "There are limited empirical data specifically addressing the academic effects of concussion" (Baker et al., 2014, p. 1286). Register-Milhalik et al. (2012) identified three types of abilities that concussions affect: cognitive, physical, and behavioral.

In this study, examining the return to the classroom included looking at the student in the academic environment as well as her social interactions, emotions, and physical condition to identify the issues and needs surrounding student-athletes as they return to the learning environment. Many questions have arisen as I have researched this study.

1. Central Question: *What is it like for a student-athlete to return to school after suffering a concussion*?

Common physical symptoms include, fatigue, difficulty concentrating (DeMatteo et al., 2015), headaches, neck pain, dizziness, balance problems, noise and light sensitivity, low energy,

drowsiness, and blurred vision, all of which contribute to student-athletes that "don't feel right" (Zemek et al., 2013, p. 260).

A. Subquestion: *How do these physical effects of a concussion affect the student-athletes' return academically*?

Jantz and Coulter (2007) discussed consequences of concussions as including neurological, cognitive, emotional and behavioral aspects. The nature of the headaches that one may suffer creates the "inability to participate in group activities and a desire to avoid or withdraw from friends and school" (Jantz & Coulter, 2007, p. 87).

B. Subquestion: *What are the social implications for student-athletes in a school setting as they are dealing with symptoms of a concussion*?

Emotional symptoms of concussions can include anxiety and depression (DeMatteo et al., 2015), which leads to the question of what it is like emotionally for a student-athlete to return to the academic environment.

C. Subquestion: *How are emotions, interactions with others, and participation in the academic environment affected by the concussion*?

Insight from the student-athlete and their friends was beneficial in gathering information on a student-athlete's return to school after a concussion. Students with injury or illness are in contact with friends, teachers, coach, school psychologist, and the school nurse, all of whom were included in this study. Previous studies (Rosenthal, 2012) have suggested gaining insight from siblings and friends along with medical professionals associated with the student-athlete.

Setting

The setting was one high school within a public school district. The high school used for this case study is in South Carolina and consisted of approximately 875 students in Grades 9–12.

At this school, 25% of students are part of a minority group: 20% black, 3% Hispanic, 1% Asian and 1% American Indian/Alaskan/Hawaiian/two or more races. Females comprise 47% of the students, and 53% are male. Economically disadvantaged students, those who receive free or reduced lunch, make up 24% of the population. The high schools in this district have a high potential of employing a nurse, athletic director, athletic trainer, coaches, guidance counselors, teachers, and administrators, all of whom potentially have interactions or contact with the student involved in this case and can provide the necessary data for this study.

The instrumental case design of this study required one primary student who was experiencing symptoms for longer than three weeks to build the case around, with the aim of discovering his or her experiences of returning to the classroom after a concussion. Faculty and staff members at the school have connections with the student either through activities or in the classroom. Classmates and friends add more in-depth data to the study. With a school of this size, there was the potential to find several participants appropriate for this study for richer, more in-depth data collection for the case study.

Participants

I chose the student-athlete participant through purposeful sampling as recommended by Creswell (2013). I selected a case based on the criteria that the student participating had experienced a concussion or mTBI, was experiencing concussive symptoms beyond three weeks, and had no prior academic accommodations in the school setting. This selection process established criteria or requirements for the purposeful sampling (Schwandt, 2015). Once Institutional Review Board (IRB) approval was been granted, I began to identify possible primary participants by sharing recruitment information with the local high schools. Upon initial contact to the district, I explained my research goals and asked for permission to work in

partnership with the schools to identify potential primary participants for the study (Appendix B). I asked the facility staff to share a prepared recruitment letter explaining the study and how to contact the researcher to indicate interest in participating (Appendix C) with potential participants. This process allowed for confidentiality and provided potential participants with control over their decision to participate.

Once I contacted the potential primary participant and her parents, I abided by the Family Educational Rights and Privacy Act (FERPA) to ensure the protection of the student. The IDEA and FERPA Confidentiality Provisions (2014) allow for a few situations in which there is no requirement for prior consent to disclose information. The one condition that applied to this study is the exception for "organizations conducting studies for, or on behalf of, educational agencies and institutions for the purposes of developing, validating, or administering predictive tests, administering student aid programs, or improving instruction" (Surprenant, Miller, & Pasternak, 2014, pp. 13–14). Although a goal of this study was to provide improvement to the educational environment for concussed students, including instruction, I obtain an informed consent/assent (Appendix D) from participants (who are, by FERPA's definition, students), and consent from their parents. I obtained consent from any eligible student, who, according to the IDEA and FERPA Confidentiality Provisions (2014), was "a student who has reached 18 years of age or is attending an institution of post-secondary education" (Surprenant et al., 2014, p. 3), as well as any adults who participated in the study.

After identifying the primary participant, I worked with her and used snowball sampling to assist in the identification of other people to contact concerning participation in this study. Snowball sampling is a productive way of gaining the names of potential participants for the case study (Patton, 2015). Decisions to approach individuals were based on the number of classes

each person shared with the primary student and the amount of time they spent together outside of school. Once identified, these potential friends and classmates were asked to participate in this study through a recruitment letter sent to the student and their parents for consideration of participation, along with contact information for the researcher. I obtained informed consent/assent (Appendix D) from students under 18 and their parents and informed consent for students 18 or older. Gender and ethnicity were not considerations when selecting people for this study, allowing for an equitable selection of participants.

Adult participant selection included reaching out to all teachers associated with the concussed student-athlete, along with coaches, staff, and administration as appropriate. To gain rich, in-depth information, the primary participant should have associated secondary participants, potentially including three to five friends, three to five teachers, coach(es), a school nurse, an athletic trainer, and any other persons identified as the case study progressed. I obtained informed consent and informed assent (Appendix D) from all participants before beginning the research process. I choose these secondary participants based on their associations with the concussed student and not based on ethnicity or gender.

As the study developed, I adjusted the participant list, adding a homebound teacher to the secondary participants. Other people of interest can add more data through their perceptions. Patton (2015) stated that a researcher "may add to the sample as fieldwork unfolds . . . [and] may change the sample if information emerges that indicates the value of a change" (p. 314). The number of participants remained somewhat fluid until a complete sample was reached to gain rich, in-depth insight into this case study. All participants gave informed consent/assent before participating in the study.

Once each group of participants were identified, I assigned them pseudonyms to protect individual identities. Predetermined pseudonyms for the primary participant included names that began with the letters A, B, or C to protect the participant's identity. Pseudonyms for friends begin with letters D through J. Teachers' last names began with letters A through L, and I gave them the identifiers of Mr. or Ms. to reflect their correct gender. I referred to coaches as Coach and a last name beginning with M through P. I assigned the athletic trainers, nurses, and other personnel last names beginning with letters Q–T. Guidance personnel and the district psychologist were assigned letters U through V, and school administrators were assigned letters W through Z. As the study developed, locations were assigned three letters along with their designation, such as High School or Hospital. The doctors that are referred to were given last names based on the 10 most common last names in the United States. Considerable effort was made to protect the identity of all involved.

Procedures

The procedures in this study began with finalizing the research plan and presenting it to the university's IRB. Once I received IRB approval, I began the process of selecting a site and seeking permission to conduct the study. After reaching out to the school district and school, I gained permission (Appendix B) to conduct the study at ABC High School. Because I was working with students of high school age, I shared information with students and parents to explain the purpose of the study and asked for their willingness to participate and to provide informed consent and informed assent. Once I confirmed the primary participant, I used snowball sampling to recruit people associated with the student in the educational environment to participate in this study. Sharing information on the study was accomplished through a recruitment letter mailed to the parents of participants under 18. The letter also included the

consent/assent forms that detailed the expectations of participation. After securing a Release of Educational Information, I was able to obtain the primary participant's class schedule from the principal at our first meeting (Appendix F) and the names of faculty and staff members who had an association with her return to the classroom. I then contacted the named adults and asked for their participation (Appendix C). Upon agreement, I provided a letter of informed consent that outlined the expectations for the study.

Once I confirmed participants and collected consent and assent, various groups were established and interviews began. As I conducted the interviews, I was aware of the potential for snowball sampling as new participants could have been identified. While the interviews took place, documents were collected. Once I interviewed the primary participant, I asked her to keep a journal for a a few weeks, reflecting and focusing on the central research questions as a means of data collection. Once I finished interviewing the secondary participants, I asked them to participate in a focus group in the following weeks.

I collected documentation with permission from the case study student and her parents (Appendix F). All documentation collected was used in the analysis process. Protection of anonymity began as I collected physical documents and before dissemination occurred. All data were coded with pseudonyms as assigned, and real identities were redacted. The only identifiers of student participants are their pseudonym and grade level. Identifying factors for adults are their pseudonym and their position as it relates to the primary participant. I will keep all hard-copy documentation in a secure, locked location and all electronic documentation is password protected for a required period of three years.

The Researcher's Role

In this study, the primary role of the researcher was to design and implement a study that is relevant to real-world issues and would add empirical knowledge to the research that is currently available while respecting the rights of the people through utilizing ethical practices throughout the study. Ethical practices included gaining informed consent and assent from participants, protecting and maintaining privacy and confidentially, protecting participants who may be vulnerable, and protecting all participants from harm or deception. The protection of all human subjects was the guiding force in the data collection, as I utilized pseudonyms to protect all identities.

This study was conducted at a high school where I had very limited relationships with the faculty and staff. I collected data from the participants and people associated with them to provide insight into the journey from impact to recovery of a student in the process of returning to learning. To minimize researcher bias, I continuously used bracketing, memoing, and journaling throughout the research process.

Data Collection

Data collection is a critical aspect of any qualitative research. In this case study, I collected data through interviews, document analysis, focus groups, and journals. I conducted interviews once I had obtained consent and assent, allowing for the possible uncovering of other people interested in providing data concerning this study. Such people provided validity for the stories that emerged. Once I completed the initial interviews, I conducted a focus group with friends and classmates and one with faculty and staff members.

Interviews

The types of interviews associated with this case study involved the elicitation of stories of experience. According to Schwandt (2015), this type of interviewing will "generate 'in-depth'

data that are the product of the empathetic relationship between interviewee and interviewer as peers, companions, conversational partners, etc." (p. 172). Although the questions were open-ended, they asked the interviewees to begin their responses when the student-athlete first returned after suffering the concussion. The standardized, open-ended interview questions are as follows.

Student-athlete's questions.

1. Icebreaker: What are your favorite activities at school?
2. Would you be willing to share how and when you received your concussion?
3. What was it like to return to school after suffering a concussion?
4. Describe the reactions of the people around you.
5. What types of physical symptoms did you experience at first? What about now?
6. How did these physical symptoms affect you academically and in the classroom?
7. Did the concussion change how you participate in class?
8. What activities do you like to do with your friends socially?
9. How has the concussion affected your social life?
10. How has the concussion affected your interactions with others?
11. Is there anything related to your experience that you feel is important to share? It could be a significant concern or something small that you would like to share.
12. If needed, may I contact you by e-mail, phone, or otherwise to follow up on any questions that may arise?

Classmates' and friends' questions.

1. Icebreaker: What are your favorite activities at school?
2. Would you be willing to share how you found out about Cynthia's concussion?

3. Describe Cynthia when she returned to school.
4. Describe any changes in her participation in class.
5. Can you describe Cynthia's social activities?
6. How has she changed since the concussion?
7. Have Cynthia's interactions with others changed? In what ways?
8. Is there anything related to this study that you feel is important to share? It could be a major concern or something small that you would like to share.
9. If needed, may I contact you by e-mail, phone, or otherwise to follow up on any questions that may arise?

Teachers', guidance counselor's, nurse's, athletic director's, athletic trainer's, and administrators' questions.

1. Icebreaker: What is your position at the school? How do you know Cynthia?
2. When did you learn about Cynthia receiving a concussion?
3. What type of physical symptoms did you notice from Cynthia at first? What about now?
4. How did these physical symptoms affect Cynthia academically? In the classroom?
5. Did the concussion affect how Cynthia participated or participates in class?
6. What activities are you aware of that Cynthia is involved with socially?
7. What have you noticed about Cynthia's social life being affected by the concussion?
8. What have you noticed about Cynthia's interactions with others being affected by the concussion?
9. Is there anything related to this study that you feel is important to share? It could be a major concern or something small that you would like to share.

10. If needed, may I contact you by e-mail, phone, or otherwise to follow up on any questions that may arise?

The purpose of asking similar questions to the three primary groups was to develop themes and to keep the study focused on the problem, which was to understand issues that surround student-athletes returning from concussions.

Document Analysis

Several documents were collected for analysis for this study, including confirmation of the lack of prior accommodations for the concussed student, since a prior learning disability may present as cognitive concussion symptoms. Documentation of previous and current grades and attendance could have assisted in determining the physical impact the concussion had on the student, as did documentation of trips to the nurse's office associated with the concussion and documentation from the school psychologist. Communication between school faculty and staff and the student-athlete and her parents concerning the effect of the concussion on the student revealed the procedures in place at the school for concussed students. However, this documentation, even though requested, was not produced. All documentation was gathered with permission from the parents (Appendix F). The school district did require their own release form to be signed by the student-athlete's parent. Documentation was requested on several occasions from the school nurse but was not produced. I was anticipating receiving information concerning physical symptoms and their duration and effects on the student and how the medical team managed these effects, which would have been beneficial. I collected medical information from the student's parent, including confirmation of the date of concussion, confirmation of the date of diagnosis, and verification that symptoms have lasted for three or more weeks. The medical information also included test results, the diagnosis, and prescribed procedures for

recovery. I immediately coded all the data collected with pseudonyms and keep it in a locked, secure location for the protection of privacy.

Focus Groups

Focus groups provided an opportunity for me to interact with multiple participants at the same time. In this study, I held a focus group in person with friends and classmates of the primary participant at a public location in proximity to the students and one for faculty and staff members at the high school. Focus groups are especially useful for exploring complex, multi-layered concepts from the perspectives of the participants. Each participant was assigned a pseudonym that corresponded with the pseudonym used during interviews, in the data dissemination, and in the final report.

Teachers associated with the concussed student-athlete participated in a focus group to share their observations and concerns about her return to the learning environment. This focus group time allowed an opportunity for the teachers to share any accommodations or adjustments they had made for the student-athlete in their classrooms, reveal what worked and did not work for the student, and hold a professional discussion on how concussed students are addressed as they return to the classroom.

Friends of the student-athletes also participated in an in-person focus group to share their experiences with the student in and out of school. I asked them to share any observations of the student-athlete in and out of the classroom, including interactions, behaviors, and reactions that they encountered with the concussed student-athlete.

Journaling

Journaling by the concussed student provided insight into how she dealt with issues during the period of recovery, including her educational environment, social environment,

physical being, and emotional state. I gave the student a bound notebook at the beginning of the study with a few general guiding questions. I collected the journal at the end of the study, transcribed it to a digital format for analysis, and secured the journal with all original documentation. Due to the visual issues with screen time and headaches, an online journaling option was not presented to this participant. This method of data collection gave deeper insight into how the concussed student-athlete was dealing with the RTL and provided her an opportunity to reflect on her own interactions with the learning environment.

Data Analysis

I analyzed the data I derived from the interviews, documents, focus groups, and student journals. The interviews and friends/classmates focus group and the faculty/staff focus group were conducted face-to-face and audio taped with permission. The case student was asked to hand write in the journal. I transcribed all audio files and coding the data using predetermined pseudonyms. Once all data were transcribed, it was loaded into ATLAS.ti for analysis using coding and memoing. For case studies, researchers can use computer tools for coding and categorization of data but not for the final analysis of the data. I was the primary tool for the final analysis. Once all interview data had been entered, it was analyzed for emerging themes or information that could add support to themes discovered through interviews, primary and secondary source documents, focus groups, and student journaling. Documents collected were not able to be scanned and loaded into ATLAS.ti for coding and memoing because they loaded as one picture, and I did not have the ability to code and memo line by line. Disseminating the data included creating a timeline, organizing information, highlighting the documentation, connecting information to data collected from the interview, utilizing the existing codes, and creating new codes as necessary. All documentation is kept in a password-protected, secure

electronic location and hard copies under physical lock and key. Bracketing was used throughout the data collection and analysis to eliminate any researcher bias.

I analyzed the case to identify common themes. This assisted in building explanations, with the goal of developing ideas for further study (Yin, 2014). Collected data were organized in chronological order using a time-series analysis as described by Yin (2014). Placing events and information in chronological order allowed for the researcher's analysis to occur, which included searching for common themes, similarities, and differences in the perceptions of the participants of the study, and especially within the physical documentation that was collected. Since a case study is time-limited, a chronological approach is appropriate for a case study analysis.

Within the chronological framework of analyzing the case, I analyzed interviews based on the topic of the question, tying input from various sources together. These questions aimed to discover multiple physical, social, and emotional perspectives of a concussed student returning to school following a concussion. I analyzed the focus groups' data in the same manner. Documents and journal entries added valuable, concrete data to support the themes and the story that emerges. After collecting the data, analyzing for themes, and organizing them chronologically, I was able develop the case study story. "The case study should take the reader into the case situation and experience . . . allowing the reader to understand the case as a unique, holistic entity" (Patton, 2015, p. 538).

Trustworthiness

I determined trustworthiness through credibility, dependability, transferability, and conformability. Addressing each of the areas ensured the establishment of trustworthiness. Procedures to establish trustworthiness include, but are not limited to, bracketing, reflexivity, triangulating data, member checking, and using direct quotation with permission from the

participant. Triangulation of evidence included looking for common themes in different sources of data (Creswell, 2013).

Credibility

Like internal validity, credibility has as much to do with the researcher as it does with the research itself (Patton, 2015; Schwandt, 2015). "Because the researcher is the instrument in qualitative inquiry, the credibility of the inquirer is central to the credibility of the study" (Patton, 2015, p. 707). Patton's credibility concerns include who is doing the study and the effects of the researcher on the study.

In this study, I used bracketing through memoing and journaling, deciding how to involve my understandings with this study (Creswell, 2013). A memo log reflects the procedures that I followed to conduct the research. My journal includes a reflective log, which went beyond my emotions and included reflexivity, allowing me to reflect on the questions that Patton (2015) has presented: How do you know what you know? What shapes and has shaped your perspective?

Dependability

Dependability reflects the reliability of the study. Was the researcher logical in how he or she designed and conducted the research? Are all the findings traceable back to the source for verification? Is the study well documented? Schwandt (2015) stated that the researcher (inquirer) is responsible for addressing all three of these areas during the process of conducting research. To establish dependability, I used member checking to validate the credibility of the data analysis. Lincoln and Guba found this to be "the most critical technique for establishing credibility" (as cited in Creswell, 2013, p. 252). With a case study, Robert Stake (1995) stated that the participants play a major role in the research process. They should be involved to

"examine rough drafts or the researcher's work and to provide alternate language" (Creswell, 2013, p. 252).

Transferability

Like external validity, transferability refers to the ability to use the reported data outside the study itself. Can readers find similarities between the case under study and another case (Patton, 2015; Schwandt, 2015)? If the design of the case focuses solely on the study itself, it will produce data that are only relevant to the case itself and are of little use beyond the individual case (Patton, 2015). To achieve transferability, I sought input from committee members during the process of research.

With this case study, I developed a better understanding of students and their return to the academic environment after suffering concussions. The case I present here centers around one student. As I analyzed the case, I looked for themes that emerged once I had collected all the data. Therefore, the design relates to the issues and needs that students have as they return to the classroom. This allows for the possibility of transferring data to encompass most students who have suffered a concussion.

Confirmability

Confirmability entails ensuring that a study represents the facts and data honestly (Schwandt, 2015) and establishing that the data presentation is in its truest form and that the researcher has not invented it. I conducted bracketing thorough memoing and journaling to prevent misconceptions. Also, I used member checking to ensure that the data presentation matched the expectations of the participants, validating the data I present. I used peers to review content, including a medical doctor with experience in concussion management who served on my dissertation committee.

Ethical Considerations

To maintain an ethically appropriate study, I submitted this study to Liberty University's IRB for approval and completed the required ethical research sessions, including one on researching with children. This board acted as a governing body to ensure the protection of the participants I described in this study. I used informed consent and child assent forms for the protection of all participants of this study and followed all IRB guidelines.

I kept all the data I collected on a password-protected computer, with a password-protected (backup) external hard drive. Only I have the passwords. I have given any proper name (site, participant, etc.) a pseudonym to ensure anonymity for all participants. I coded all data with pseudonyms in the event there is a request for the data for future research. I have secured all data in hard form in a locked safe. Communication with committee members has not included any formal names of participants, site, or any identifiable labels, but if necessary, may have included pseudonyms.

I treated participants with respect as they assisted in guiding this study to promote understanding of the phenomenon I am researching. I have reported the findings honestly as I have discovered them throughout the study. As a researcher, I minimalized my bias through bracketing, memoing, and journaling. I conducted this study using a Christian worldview, honoring God as the guiding force in all aspects of this research.

Summary

The instrumental case study presented here aims to gain insight and knowledge into a subject that applies to today's society. This study is necessary, as it adds empirical knowledge, in qualitative form, to a knowledge base that is very quantitative and medical in nature. Information to support concussed students in the field of education is necessary if educators are

to meet the needs of all students. This study has brought more information to the area of concussions in the school setting, while ensuring the protection of all participants of all ages involved in this study.

CHAPTER FOUR: FINDINGS

Overview

The purpose of this qualitative case study was to explore how a student-athlete suffering from a concussion or mTBI coped academically in a high school environment as she returned to the classroom. The focus of the study was to examine issues surrounding a student returning to the classroom following a concussion whose symptoms lasted beyond the typical three-week recovery time. Areas of focus included academics, physical symptoms, social interactions, and any emotional issues that may have presented themselves as a result of the concussion. The primary participant, Cynthia, and her parent, teachers, and friends were asked questions in interviews and focus groups that would support the research questions in this study. The primary participant also added rich data through journaling about her return to the classroom. Documentation provided by Cynthia's mom, the school, and the school district corroborated information shared in interviews and focus groups and added much detailed data to support this case study.

As this case study is qualitative in nature, this chapter will offer an in-depth detailed description of the primary participant derived from the data collected. The secondary participants will be described based on their relationship to the primary case participant and their knowledge of Cynthia as she made her journey back into the classroom. Themes that developed through coding will be discussed in detail, including Cynthia's struggles to return to the classroom, the need for homebound instruction, and the social and emotional impacts of the concussion. As with any analysis, the research questions will be answered with the data provided to gain a better understanding the physical, social and emotional aspects of what it is like for a student-athlete to return to the classroom following a concussion.

Participants

The participants in this case study include a primary participant and secondary participants (Table 1). The primary participant identified the secondary participants through a recommendation of participants form (Appendix H) or from the data received from the primary participant's mother and the school. Table 1 identifies each participant, his or her association with the primary participant, position or job title (if applicable), and any other information that may be noteworthy. Pseudonyms have been assigned to every person and the local school and district to protect the identities of all participants involved with this research. Following the table is a description of each participant and his or her relationship with the case study participant.

Table 1

Participant Background and Association to the Case

Pseudonym	Association to Case	Position/Relationship to Case
Cynthia	Primary	Primary Participant who suffered a concussion and returned to the classroom.
Emma	Friend	Same age, grade, and school
Fran	Friend	Same age, grade, and school Friends since preschool Ride together to school
Ms. Anderson	Homebound instructor	Intermittent homebound instructor assigned by the district to assist in keeping Cynthia caught up Experience working with TBI students
Ms. Davis	Teacher	10th grade Spanish
Ms. Effingham	Teacher	9th grade science
Ms. Frank	Teacher	10th grade math
Mr. Garcia	Teacher	10th grade student leadership
Mr. Harris	Teacher	9th grade English New athletic director since Cynthia suffered her concussion
Ms. Ingles	Teacher	10th grade English
Mr. O'Day	Teacher	9th grade PE 10th grade drivers education Has known Cynthia most of her life, including driving her to school for some time
Ms. Stuart	School nurse	Assisted Cynthia in managing symptoms
Mom	Parent	

Cynthia

Cynthia is currently a junior at ABC High School. We conducted her interview in June of the summer between her sophomore and junior year, and she journaled for several weeks to add more in-depth data to this study. Cynthia has a very supportive family with both parents and siblings at home. Attending a local public high school, she appears to have good friends and enjoys school activities when she can, especially sailing as a member of the high school competitive sailing team.

Cynthia received her concussion(s) in October of 2015, only weeks into her freshman year of high school. As she recalled the time period when the injuries occurred, she admitted to

having trouble with dates. However, she was able to provide the general period without problem. The hits to her head happened on two separate days. The first one was at practice on October 14 when her boat capsized, and the second one happened the next day while she was sailing in a high school competition regatta over the weekend.

After the initial hit to the head, she told her parents what had happened and informed them that she felt okay and wanted to go out with friends and attend a local event in her hometown. She did not report the second hit to the head to her parents until after she went back to school and had suffered headaches for several days. She eventually went to the nurse at the end of the week. At the second visit to the nurse for headaches, she shared that she had been hit in the head twice the previous weekend. Her primary complaints of physical symptoms were headaches and dizziness. At the time of the interview, less than two years later, she shared that the headaches and dizziness still occurred, but less often. Once diagnosed with a concussion by her local doctor, she was put on bed rest before she could go back to school.

When asked about what it was like to go back to school after her concussion, Cynthia shared that focus was an issue. It was difficult for her to make up work while keeping up with current work, and her grades dropped significantly. She shared that while her friends were supportive, other students teased her about faking her injury, and she was not sure if they were joking or not.

Cynthia did not return to school for several weeks following the reveal of her second injury and officially being diagnosed with a concussion. Following the six days of absence with a medical excuse, she was out for 16 more days that are now identified as homebound or home-based days by the school district. Initially, on her return to school, Cynthia could not resume a full-time schedule successfully. She tried for about a week and then had to switch to attending

every other day. At times, she could only attend every other class on alternate days. In the middle of December, she was approved for intermittent homebound instruction and a 504 plan. These accommodations, in addition to dropping a class and rearranging her schedule, allowed for her to finish the school year and be promoted to 10th grade, finishing the year with grades of Bs.

Although all aspects of the concussion affected Cynthia in all areas of her life, the physical symptoms were primarily responsible for keeping her out of the classroom and away from loud, noisy situations. The cognitive effects of the concussion greatly impacted how she interacted with others. This was due to her minor loss of verbal skills and the ability to find the right words to say or complete a sentence. Cynthia shared that she felt that her interactions with others and the way others interacted with her was also affected by the concussion and the symptoms that she suffered following the concussion.

During her 10th grade year, Cynthia decided not to use her 504. She wanted to complete her schoolwork that year on her own. From what her mom and teachers shared, this particular year was a struggle at times, but Cynthia did complete the year with at the most 16 absences from one class and grades of As and Bs. Many of her teachers were not aware that she had suffered a concussion the year before and she was still suffering some of the physical symptoms such as headaches.

Overall, Cynthia had a difficult time dealing with the effects of the concussion and realizing that it was going to take time to recover from it. Suffering from PCS symptoms for an extended time was a challenge for an active, social teenager who had plans for college.

Mom

Cynthia's mom was by far her number-one advocate. During the interview, it was evident that she had many struggles associated with Cynthia's recovery, including working with

the school to ensure that Cynthia was able to take the time to recover and have ample time to get her schoolwork caught up and with the medical doctors who seemed not to know what was going on with Cynthia and were misdiagnosing her at times. Cynthia's mom ended up taking her to several doctors before a more accurate diagnosis and a medical/academic plan would be in place to assist her with recovery.

The concern for Cynthia's well-being was well founded. Cynthia's mother shared that Cynthia could not read without getting a headache. Noise and light contributed to her symptoms of headaches, dizziness, and nausea. Her mother was anxious about the fact that Cynthia, who was once a good writer, could not organize her thoughts to even get them down on paper, much less create a proper paragraph. Cynthia could not recall her multiplication tables, and her math teacher refused to allow her to use a calculator even though it was written in her IEP.

Dealing with the school was frustrating for Cynthia's mom. She had to provide the same requests several different times. Her multiple attempts to ask for homebound education and accommodations was confirmed by multiple copies of said requests found in the data provided for use in this study. She also did not understand the lack of communication between departments within the school itself. Cynthia had IMPACT testing conducted at the school by the athletic trainer, who commented, "This is the worst score I've ever seen," according to her mother. However, the information provided by the athletic trainer was not shared with Cynthia's teachers to inform them of her concussion. Cynthia's mom felt like the school had the information concerning the concussion and did not inform the people who needed to know what was going on.

To deal with the medical side of things, Cynthia's mom took her to their local doctor, Dr. Brown, who prescribed cognitive rest once and ordered an MRI. After a month and a half,

Cynthia was diagnosed with PCS, and her local doctor requested that the school develop a 504 and conduct psychological testing to provided accommodations as needed, along with referring her to XYZ Hospital's pediatric neurology department. Two and a half months after sustaining her concussion, Cynthia was seen at XYZ Hospital. According to data provided by Cynthia's mom, the hospital took in vitals, patient history, and then referred her to the department of psychiatry with diagnoses of PCS and depression. The local doctors did not think she was depressed, just frustrated with her current situation.

After a few months of not improving, Cynthia's mom took her back to her local doctor. Dr. Brown prescribed an ADHD medication for Cynthia to assist her with her focusing. Meanwhile, mom had already set up a medical appointment in the next state at TUV Hospital's neuropsychology department due to concerns of Cynthia's daily headaches, not sleeping well, frustration, and irritability. At this visit, extensive cognitive testing was conducted, and finally, a doctor put everything into perspective for Cynthia, basically reaffirming that she was not depressed and not crazy, but frustrated. The doctor was able to put into words how Cynthia had been feeling; she was mad because she could not live life as she previously knew it. Although this sounds harsh, Cynthia's mom said it was a turning point for Cynthia. Slowly, improvements began to happen following this visit.

Cynthia's mother strongly believes that parents must be an advocate for their child during times like this. She shared that during Cynthia's 10th-grade year, Cynthia wanted to try everything on her own and not depend on the IEP. Her mom ended up emailing the teachers to inform them that Cynthia did have an IEP and may still need a few of the accommodations that were implemented the prior year. Cynthia's mom also believes that doctors and teachers do not

know a child as well as his or her parents do, so the parent must be the advocate at times to ensure the child is getting his or her needs met.

Emma

Emma is a friend of Cynthia's who lives within walking distance to her house. Being very supportive during Cynthia's recovery, Emma would visit Cynthia at home to check on her regularly. Emma shared that she believes that Cynthia is a very strong person to have overcome what she has been through as she recovered from this concussion and that it has made her an even stronger person.

Emma was crewing for Cynthia at sailing practice when the first hit to the head occurred. At the time this incident happened, Emma was concerned about Cynthia and remembers her being quiet but saying that she was okay. Emma was also at the regatta when the second incident happened. She did remember Cynthia saying that she had a headache after that, which was followed by being out of school for weeks, when Emma would visit and keep her company since Cynthia's parents restricted her screen time during her recovery.

Once Cynthia returned to school, Emma would often see her in the nurse's office. Emma had her own health issues that created a need for her to be in the nurse's office often. There the two girls would discuss the headaches and dizziness. This is where they analyzed the dizziness each was experiencing and compared Cynthia's dizziness to the floor moving, like a never-ending boat ride.

It is very evident that Emma was a great source of support for Cynthia during the recovery process, checking on her every opportunity she had at school and home. This type of support is an essential part of any recovery process.

Fran

Fran is another friend who was supportive throughout Cynthia's recovery from her concussion. Fran and Cynthia attended preschool together and have been friends since. Just like Cynthia, Fran has lived in her area her whole life. Although their interests have taken them in different directions as they have gotten older, they have stayed friends and ride to school together often.

When the concussion happened, Fran tried to spend time with Cynthia at her house, but other commitments kept her from going as much as she wanted to. Fran described Cynthia as being very unfocused after the concussion happened: "She couldn't focus on the sentence she started and would start a new one." She said that Cynthia's personality had not changed, just that "she just wasn't completely normal."

Although Fran did not share classes with Cynthia, she did pick up her assignments at school when she was out and take them to her house. Fran was very cognizant of the idea of not ignoring Cynthia just because she was not at school and could not do other things during her initial cognitive rest. She said, "I had to go hang out with her to make her feel a little happier." During both the interview and focus group, it was apparent that these two girls were good friends and looked out for each other.

Ms. Anderson

Ms. Anderson was the homebound teacher that was assigned to Cynthia when she was approved for intermittent homebound services by the district. It is not clear how Ms. Anderson was assigned to Cynthia, but it truly was through God. Ms. Anderson has a strong background in using multimodality techniques with students to get results. She shared that many of her techniques were developed by Dr. Fernald, who was known for dealing with veterans from World War II. She considers him one of the first to create techniques for working with people

with brain injuries by using sensory modality education. She has worked with TBI and learning-disabled students in the past using multimodality instruction. She said, "You have to get to the multimodality level because you never know what is going to stick."

While working with Cynthia, Ms. Anderson also took the time to explain her brain injury and why some things seemed difficult when they did not before. Ms. Anderson shared that she explained that Cynthia's brain was having to reestablish synapses. This explanation is so very similar to the recent theories that Dr. Molfese has developed concerning neural pathways that are disrupted by a concussion having to find new pathways to deliver information. Ms. Anderson is very well versed in how the brain works in conjunction with how students learn.

Ms. Anderson came to the interview with her own set of notes of things she wanted to share, demonstrating her passion for teaching students where they can learn. The techniques and information that she shared would work for all students. She shared that organization is critical for any student to be successful. Organization is key for not only the student but also the mind. Sequencing was also a useful technique to assist students in learning. Ms. Anderson is very passionate about student learning and was very excited to work with Cynthia through her recovery.

Ms. Davis

During 10th grade, Cynthia had Ms. Davis for Spanish. When I met with Ms. Davis, she did not remember Cynthia at first from the previous year. When she finally made the connection, she said that she thought Cynthia had been in a car accident. Ms. Davis did remember that Cynthia was in Spanish in ninth grade but had to drop the class. She described Cynthia as "a very quiet girl" and did not note anything about her struggling or behavior. She

stated that Cynthia did well academically, finishing the class with a 90, which exempted her from the final exam for the class.

Ms. Effingham

Ms. Effingham was Cynthia's Biology I Honors teacher in ninth grade when she suffered her concussion. She remembered that when Cynthia returned, she seemed to be a little lost, to the point that Ms. Effingham questioned whether she should have come back to school. She recalled, "It just seemed like she was not able to jump back into it," noting that Cynthia seemed to be overwhelmed with trying to learn new material and accomplish new work while trying to make up everything that she missed. Ms. Effingham also stated how helpful the homebound teacher was with assisting Cynthia in getting work accomplished.

Because the concussion happened early in the school year, Ms. Effingham did not have much to compare from before Cynthia's injury to after her return. However, she did state the disorganization may have been there before the injury and "the injury . . . just compounded on that and amplified it."

Ms. Effingham shared that she would allow Cynthia to pair up with another student who was helping her in class, even when partner work was not expected. Moreover, she would follow up with her to make sure assignments were turned in. The follow up was one of the items in the 504 plan, but the peer-buddy situation was not an accommodation that was mandated. The peer buddy was because Ms. Effingham saw a way to assist Cynthia with learning and allowed it.

Ms. Frank

Ms. Frank was Cynthia's Algebra II Honors teacher in 10th grade. When our interview began, she had difficulty placing Cynthia. She did not realize what Cynthia had been through the year before with PCS. As far as she was concerned, Cynthia had a good year academically,

socially, and behaviorally in her class. Ms. Frank did say that she would always get her assignments when she missed school and that her grade was good enough to exempt her from the final exam.

Ms. Frank also shared that she has had students in the past that have had concussions. She seemed concerned that, from her perspective, there was no follow up on these students to see how they were doing and if they were able to get back into their routine without issue. She was intrigued with this study and believed that it will be of value to educators.

Mr. Garcia

Mr. Garcia taught Student Leadership to Cynthia when she was in 10th grade. At first, he could not place her from class. Once we were able to identify her, he indicated that he never knew she had a concussion. Because his class is primarily participatory, and he did not coach her in a sport, he was not focused on looking for issues with her. She also was a quiet student in his class.

Mr. Garcia did note that Cynthia was "an academic" who was stressed about her other classes at times. He did allow for a study hall on Wednesdays, where students could work on other assignments if they needed to or break into groups to discuss problems. Cynthia would use that time to go to the library, see a teacher, or complete other work. He commented that although she may have been stressed, she handed it "in a professional way."

Mr. Harris

In eighth grade, Cynthia took English I Honors as a middle school student. When she advanced to the high school, she was placed into an English II Honors class with Mr. Harris. He remembered Cynthia being there and then being absent. He shared many details on the struggles that she had with his class, understanding that she was trying to make up work while learning

new material. He indicated that his curriculum is based on building from prior learning and this put Cynthia at a disadvantage in his class.

Mr. Harris had noticed some struggles from Cynthia before the injury and believes that the injury just exacerbated it. With doctors limiting the time she could spend on work and the extra time it took her to do it, it was difficult to keep up in his class. He shared gratitude for Ms. Anderson's work with Cynthia and her teachers to get her work caught up.

There was a concern on Mr. Harris's part that communication of what was going on with Cynthia initially had not been conveyed to him as her teacher. He was not sure where the breakdown was, but he found out what happened by visiting the front office and asking. Another concern he shared was that when Cynthia did come back to school, he could tell "she wasn't feeling right." He did serve on her 504 plan team to develop a plan and accommodations.

Mr. Harris is passionate in his believe that when students are injured with a concussion, they should be out for one to two weeks for cognitive rest. Having a family member who has suffered from PCS for more than four years, he knows the seriousness of taking care of students after the injury has occurred.

Ms. Ingles

The teacher for Cynthia's English III Honors class during 10th grade was Ms. Ingles. Ms. Ingles teaches Honors English and competitive speech for the high school. She could not remember who initially informed her that Cynthia had a concussion, but she did state that Cynthia did share that information with her.

Ms. Ingles reported that she did not remember Cynthia reporting any physical symptoms but did share that she was a "very hesitant participant in class." She indicated that Cynthia was an average student and that "there were times where she may lag behind a little for an honors

level." Her interview concluded with her stating, "I didn't see anything too unusual or abnormal with her at all. Pretty normal kid really."

Mr. O'Day

Mr. O'Day is the high school physical education coach and drivers education instructor. Cynthia took physical education in ninth grade and drivers education in 10th grade. He was able to see her recovery over the two years. Mr. O'Day is also the father of Cynthia's friend Fran. He recalled driving them to school before they could drive themselves, stating that he saw Cynthia every day and that she was a quiet girl. He was not sure if she was quiet due to shyness or being in the car with her friend's father.

Following the concussion, Cynthia was not allowed to participate much in physical education. Mr. O'Day believed that she had not fully recovered during driver's education either. He only saw drivers one day a week and stated that she would forget how things worked on the car and ultimately, she did not complete her final drive with him and did not receive her certificate. Several things were identified for her to continue working on for her driving certification required for a license.

Ms. Stuart

Ms. Stuart is a registered nurse that works at the high school, taking care of the day-to-day needs of all the students. She came to know Cynthia when she came to the nurse's office with a "really bad headache." She discovered that Cynthia had not told her mom about the second hit to the head from the prior weekend at the regatta, and after hearing her symptoms, she called home to have her parents come to pick her up and take her to a doctor.

Ms. Stuart was very concerned about Cynthia and her recovery, stating that she spent much time in the nurse's station at the school. She was also concerned about the time it took

Cynthia to respond to questions: “She would think about things and answer a little slower than I expected her to.” She also mentioned that Cynthia was doing physical therapy and was put on a diet and supplements for her concussion. To Nurse Stuart, these therapies seemed to be fitting for a brain injury.

Other concerns that Ms. Stuart had concerning injuries, including concussions, was the idea that some students play through their injuries. She asked, “What is going to happen when somebody dies here because they have a brain bleed?” She expressed the need for students to be educated on concussions. She fears that students may not want to come forward because they may be cut from a team or not allowed to play.

Others Referenced

Other people referenced in this study who were not interviewed and associated institutions are also identified with pseudonyms for the protection of all who were involved with this research study. Table 2 list pseudonyms and the individuals’ relationship to the research study presented here.

Table 2

Other Pseudonyms Associated with Research

Pseudonym	Reason Included in Research
ABC High School	High school of attendance by the primary participant
Somewhere School District	School district where this case study was conducted
Anytown Pediatrics	Local doctor's office of the primary participant
Dr. Brown, MD, FAAP	Anytown Pediatrics
Ms. Miller, APRN, CPNP	Anytown Pediatrics
XYZ Regional Hospital	Teaching hospital within the region where the research study was conducted
Ms. Williams, FNP	XYZ Regional – Pediatric Neurology at Rutledge Tower
Dr. Jones, MD	XYZ Regional – Department of Psychiatry
TUV Hospital	Nationally used hospital in the southeast region of the United States
Dr. Johnson, DO	TUV Hospital
Dr. Smith, Ph.D.	TUV Hospital: Neuropsychology

Results

The case study presented in this study is centered on a high school student, Cynthia, who suffered a concussion during her freshman year while sailing. The data were collected over approximately four months from interviews, focus groups, document analysis, and journaling by the case study primary participant, Cynthia.

All interviews were audiotaped and transcribed by the researcher. Participating in interviews were the primary participant, her mother, two friends, seven teachers, her homebound instructor, and the school nurse. When I reached out to the school psychologist, she declined to participate because of confidentiality concerns on behalf of the school district. However, she did provide the documentation that was requested with permission from Cynthia's parent. The documents provided by the school psychologist and Cynthia's parent added much data, provided a great deal to the chronological list of events, and corroborated data provided by other collection methods. Focus groups were the biggest challenge to schedule but were successful in adding and

corroborating data previously collected. These were audiotaped and transcribed by the researcher. The most important data were collected from the personal journal that Cynthia kept. The entries were not abundant, but they very insightful to how Cynthia felt about dealing with all of issues that arose following her concussion. She was courageous to share this information from her perspective as she did. This data added a rich, in-depth insight into what it was like for her to recover from her concussion as she returned to the classroom.

With the amount of data gathered, it was best to begin with putting events in chronological order to begin building the case. By creating a timeline, one can appreciate the challenges that Cynthia faced on her road to recovery. Even now, present day, full recovery has not been achieved, but according to Cynthia, she is living her new normal.

Table 3

Chronological Events of Cynthia's Injury: Reported and From Data

Date	Event
10/15/16	Sustained first hit to her head during practice. Informed mom the same day
10/16/16	Sustained second hit to her head during a regatta. Informed no one
10/18/16	Returned to school
10/20/16	Reported to nurse's station with a bad headache. Reported what happened and then Cynthia's mom was informed about the second hit to the head
10/21–10/28/16	Medical excused absences
10/28/16	Doctor's visit: placed on cognitive rest
12/02/16	Doctor's visit
12/05/16	IMPACT testing
12/07/16	Doctor's visit: diagnosed with PCS. Requested 504 accommodations, psychological testing, and homebound instruction
12/14/16	IEP meeting: approved intermittent homebound, developed accommodations, parent requested cognitive testing, reviewed medical report of PCS and cognitive processing and attention concerns
12/19/16	Visit to XYZ Regional Hospital: Diagnosed with PCS and depression Given prescriptions, diet information, and symptom tracker
01/05/17	504 evaluation: vision test, hearing test, Behavior Rating Inventory of Executive Function
01/06/17	504 evaluation, continued: Woodcock-Johnson Test of Cognitive Abilities
01/11/17	504 evaluation, continued: interview of student, conclusion of Woodcock-Johnson Test of Cognitive Abilities, Wide Range Assessment of Memory and Learning
01/25/17	Reviwed testing results and agreed that all accommodations were appropriate at that time.
03/06/17	504 re-evaluation: Clarification and extended time for future needs Still behind on schoolwork; use of school policy to retest
03/21/17	Doctor cleared Cynthia to return to sailing "as an active participant" and recommended the use of a helmet
04/03/17	Letter from doctor stating that "stimulant therapy for inattention has been started recently with good results" (about two weeks per TUV report)
04/04/17	TUV hospital visit: Concussion – cognitive testing Parents completed Behavior Rating Inventory of Executive Function Diagnosed with PCS
2016–2017 school year	Passed all academic classes with Bs
2017–2018 school year	Chose not to inform teachers of the existence of her 504 Earned As and Bs for the year Headaches and sensory issues still present but improving
Summer 2018	Still having headaches and dizziness
November 2018	Junior year going well. Attending football games

Theme Development

After many reviews and analysis of the data collected in this case study, many themes have emerged as being impactful to the results and findings of this case study. During coding, it was determined that several of the codes developed could be grouped into larger themes that shape and define this study. These themes appeared throughout various data collection methods; they are as follows:

1. Struggles returning to school
2. Necessity of homebound instruction
3. Social and emotional implications
4. Medication (minor theme)

Table 4

Codes to Inform Themes

Codes Developed	Informed Themes
Accountability for assignments	Struggles returning to school
Assignments	
Attendance	
Cognitive effects	
Coming back to school	
Course load / Class Level	
Learning	
Medication	
New norm	
Physical symptoms	
Prior difficulties / issues	
Report card	
Scheduling	
Sensory issues	
Struggle with academics	
Teacher responses	
Techniques used to assist her	
Turning point	
Homebound	Necessity of homebound instruction
Homebound difficulties	
Struggle with academics	
Techniques used to assist her	
Emotional symptoms	Social and emotional implications
Not able to finish sentences	
Medication	
Sensory issues	
Social changes	
Social implications	
Social rebuilding	
Turning point	
Medication	Medication (minor theme)

Struggles returning to school. According to Cynthia's attendance data, she went to school the Monday through Friday immediately following her concussion. That Friday, when she went to the nurse for a headache, the nurse began asking questions:

> Cynthia came to me. And this is really weird. . . . She came in that day, and she said she had a really bad headache. I said how did you get your headache. . . . She said she got hit in the head with the boom. . . . I started asking her what her symptoms were and she felt nauseated, she felt dizzy, she was really kind of almost disoriented a little bit. Like kind of super tired or something. She was just really tired and vague. She also told me that she got hit twice with a boom. Maybe the day before or something. She got hit in the same place. So, we called her mom and let her mom know what happened. And then her mom took her onto the doctors from there. So that is how I came to know Cynthia.

After this Cynthia stayed home. She went to the doctor the following week and was put on cognitive rest, and later in the week, a request for homebound services was submitted to the school. The request was submitted two weeks postinjury. According to her attendance records, Cynthia stayed home for another full week. During the following two weeks of rest, she attempted to attend school on two separate days, a Tuesday and Monday respectively, and remained at home during the remaining school week. It was not until after six weeks postinjury that she could attend school with an adjusted schedule, although she was still suffering with post concussive symptoms.

When she returned, she had "a very intricate schedule . . . she would be present a certain number of class periods and then she would go rest," according to Mr. Harris. After a short period of time, her schedule was changed to reduce her academic load and allow rest between classes. Her mom stated,

> We ended up dropping a class because she had all of her hard classes in the morning with no breaks. We ended up dropping Spanish, giving her time at lunch, and kind of giving

her a study hall at the beginning of the day. She could take a couple of classes and have a break, then have a couple of more in the afternoon . . . and that was after much fight.

Getting the school to understand Cynthia's needs was a struggle for her mom. With a concussion being an invisible injury, others could not fully understand what Cynthia needed. She lamented, "It's like you could not get them to understand what she needed . . . or that she needed a reduced class schedule." According to Mr. Harris and as confirmed by Cynthia, her schedule was eventually changed. Cynthia said, "When I came back, I would go to one class period, and then go to the nurse. Then go to the next class period and go back to the nurse again. I had to switch the classes every day." She was still not able to attend all her classes in one day.

When Cynthia returned to school, she would still suffer from headaches, nausea, and dizziness. Her friend Emma recalled seeing her in the nurse's office and discussing her dizziness: "She was very much dizzy, and she would say like the floor is moving. . . . We would compare. . . . Just kind of like . . . a boat. She compared it to a boat. Like a never-ending boat." At almost eight weeks postinjury and still suffering these symptoms, Cynthia ended up back at her local doctor. At this time, she was diagnosed with PCS, and the doctor provided a letter requesting that the school provide a 504 plan and conduct psychological testing to provide accommodations as needed. The same week, her request for intermittent homebound services was approved. A team met the following week, almost nine weeks postinjury, to develop a 504 plan. This plan gave Cynthia accommodations to be more successful in the classroom as she recovered.

The classroom was challenging for Cynthia to return to with the PCS symptoms she was experiencing. According to several of the interviews, Cynthia still had a sensitivity to light and

noise. Focusing and concentrating were also issues for her. Returning to her former academic rigor was a struggle. Ms. Effingham was concerned over the timing of her return:

> I remember when she came back. Just talking with her and the daily activities. You know, she always seemed a little lost. When she came back, I am not going to say she shouldn't have come back; obviously, that is not my decision, but it just seemed like she was not able to jump back into it. And I do remember that trying to get all that work completed, plus the new stuff for six or seven classes, she was overwhelmed a bit. For my class at least, she didn't want to do it. I do not think it was a "not want," but it was too much. And it all kept getting pushed. And things just kept more piled on and piled on and piled on.

Other teachers were also concerned over the amount of work that Cynthia had to make up with all the new work being piled on top of that. According to friends, teachers, and her mom, Cynthia was very overwhelmed with trying to make up all her work and keep up with new material. Mr. Harris expressed concern over Cynthia not learning prior material to build new learning on because much of his material was scaffolded: "Everything we do here feeds into something bigger."

Grades soon became a massive issue for Cynthia. Her friend Emma remembers, "When we got back to school, she showed me like her report card, and it was a zero as the grade because she missed so many days. So, she was more—really stressed." Cynthia explained, "I ended up having to switch out of Spanish. Because I missed so much, I was not there so basically, I had a zero for all of the second quarter." Several teachers, friends, and Cynthia's mom expressed that she was very overwhelmed with school.

Implementation of the accommodations and understanding on the teachers' part ensured that Cynthia could finish the year successfully. It took the remainder of the school year to get her caught up and to complete everything that had been assigned to her. A few teachers from that school year shared their experience with Cynthia. Ms. Effingham commented:

> It was almost like a daily "Do you have this?" making sure she had things turned in. Sometimes she would but did not have the procedure of remembering when we come in; we just turn stuff in. Or miss me saying, "Y'all turn this in." So, I would personally go up and did you turn that in, did you do that. So, it was getting done, but sometimes it was those little simple things that she was missing. Again, I don't know if that was because of the injury. And that lasted till the last day of school. Even once we got her fully caught up, it was still just trying to stay caught was a constant reminder to her. I know they got her a bunch of folders for each class and there was some organization system that was developed for her which worked, but there was still a little challenge. So, she got it all done by the end of the year.

It took teachers asking for assignments and streaming content for Cynthia to accomplish everything she needed to. Mr. Harris understood that she had a "mountain" of work to catch up on:

> I told you the biggest issue is when you're trying to work currently while you are trying to make up work that you are behind on. It is a nonstop mountain of work. I was able to streamline the curriculum a little bit, pick some things that I thought. "Okay, she can live without that," or something she absolutely had to have. The bigger stuff, of course, you can't excuse. But there are some ways I could find ways around for her.

It took a team to assist Cynthia in navigating her way through this school year. The teachers from the school year that Cynthia suffered her concussion, Cynthia, and her mother all credit her homebound teacher with helping her get through her freshman year of high school successfully. Cynthia said,

> Going back to school was definitely not easy at first. I only got half of the instruction every week compared to everyone else, and I had already missed several weeks of class. My grades dropped a good bit, and most of the time it seemed like my teachers weren't trying to help. My parents, homebound teacher, and I had to fuss to get the work I missed in class. And even after I got it and did the work my teachers often lost it. It felt like I would never get caught up. Being in school seemed pointless. Every class I went to, I was confused because I was so behind, and as soon as I understood one thing, the class had already moved on and learned something else.

Necessity of homebound instruction. As mentioned previously, returning to school was a massive struggle for Cynthia. Once Cynthia was approved for services, Ms. Anderson was assigned to work with her, providing her homebound services outside of the regular school day. In Ms. Anderson's interview, it was evident that her background included working with special education students and students who had suffered a TBI. "I would chunck her work. She would become overwhelmed with all of her work, which is typical of kids with TBI. They look at the whole picture and can no longer break it down." Ms. Anderson was able to communicate with teachers and assist Cynthia with making her work manageable.

According to Ms. Anderson, another issue for Cynthia was remembering to turn in her work: "It wasn't that Cynthia was not doing the work. She would forget to turn them in, or she would forget her assignments and forget what to do." This concern was echoed by Ms.

Effingham, who mentioned Cynthia not remembering the daily procedures and having to personally go to her to ask if she had work. Organization was another key component of Cynthia's return to the classroom. Ms. Anderson helped her organize notebooks and folders, color coding for each class. She said, "We also organized her locker. She had an a.m. locker and a p.m. locker." This deliberate organization carried over to home. Both Cynthia's mom and Ms. Anderson worked to put specific organizational procedures into place and would have to follow up to make sure everything had been accomplished and put where it belonged. Cynthia was having difficulty remembering where things belonged and how to stay organized. Ms. Anderson remembered:

> These are very logical things. But they are things that we assume that high school kids know how to do. Well, they do know how to do it, but kids with brain injuries often forget. So, organization is huge with Cynthia.

Cynthia's difficulties did not stop there. According to Cynthia's mom and Ms. Anderson, Cynthia was reversing letters and had forgotten her multiplication tables—things that had not been a problem previously. According to Ms. Anderson:

> She also had difficulty writing. I had to go back and do some things with her to get her to write. She would reverse letters. She would omit letters. Although that was a memory thing, it was also a physical thing. So, we had to go back, and again a lot of kinesthetic work, and get her aware of those reversals, aware of those omissions. Even writing papers was a major feat.

One of her mom's concerns was about processing information: "I don't think she could read the information and process it and then redigest it into a format where . . . it made sense." This concern was also observed by Ms. Anderson while working with Cynthia on major papers.

Cynthia could only manage working on one paragraph at a time, taking several weeks to finish large assignments. Cynthia's cognition and memory were one of Ms. Anderson's biggest concerns. These concerns were confirmed with her testing results, which showed a weakness in processing speed, short-term memory, and visual memory. Cynthia was also rated low-average for long-term storage and retrieval, along with attention and concentration.

The techniques that Ms. Anderson used with Cynthia included more than the aforementioned organizing, chunking of information, and working kinesthetically on her writing. She also made suggestions to the classroom teachers that would benefit more than just Cynthia. For example, she recommended that the teacher allow Cynthia to listen and make a copy of their notes rather than require Cynthia to take her own notes in order to limit the modalities that she would need to use. Once the notes were provided, Cynthia would copy them at home. This would allow her to work with the visual and kinesthetic modalities at home. She also suggested that teachers cover up notes and reveal one idea at the time. In math, Ms. Anderson gave Cynthia graph paper: "I started out with one-inch graph paper, went to one-half inch graph paper, and then finally to one quarter inch paper . . . because of the physical writing that she was having difficulty getting her number in that small square." Ms. Anderson also shared that she felt working with Cynthia's teachers cued them to pay a little more attention to her and that her peers were able to see her functioning as a student and not as a student who suddenly could not remember anything.

Through the various interviews with teachers, Cynthia, and Cynthia's mom, it became apparent that the successful completion of Cynthia's freshman year of high school was in large part due to the assistance and guidance provided by the homebound teacher, Ms. Anderson. This

journal entry from Cynthia truly reveals the impact that homebound instruction had on her return to the classroom:

> I would not have been able to get through my return to school without my homebound teacher. She helped me once a week with makeup work and was able to administer tests and quizzes I missed at school. Ms. Anderson always gave me advice and made sure all of my teachers were giving me my work and that I stayed organized. She made sure I did what I needed to in order to get caught up. Even telling me that I need to drop out of Spanish so that I could focus on my other classes.

Social and emotional implications. The most apparent social impact of the concussion on Cynthia was being out of school for several weeks following the concussion. She was almost completely removed from all social interactions. Cynthia's mom was concerned that she was very social and friendly and then shut down and did not interact with others following the concussion. She did have a couple of friends that would go visit her. Her homebound teacher commented on the fact that there was a decrease in Cynthia's social interactions. Cynthia herself remarked, "I think people that I hung out with before this, I don't really hang out with much now. I couldn't hang out with them, so they went and made other friends and stuff like that I think."

Cynthia shared that others had said to her that she had changed, like holding herself differently, having a more negative attitude, and being unable to finish sentences. Cynthia's friend Emma stated, "It was kind of like I said, she couldn't finish sentences sometimes. She wasn't different. She just wasn't completely normal." During our focus group, one student mentioned her not being able to finish sentences, and another agreed. Nurse Stuart picked up on this also, saying that she would have to think about things and responded more slowly than

normal. Others had a different view of Cynthia's concussion. When asked how her friends and classmates reacted when she returned, Cynthia replied,

> I really did not say much about it at first until they found out. Most of my friends were really supportive, and there were a few people who I did not know if they were joking or not, were like, "You're really faking it." Just kind of joking and stuff. Most of my friends were really helpful.

This comment speaks to others not understanding how a concussion affects a person and further demonstrates why a concussion is referred to as an invisible injury.

Cynthia's emotional struggles were noted by those closest to her: her mom, her friend Fran, and Ms. Anderson, her homebound teacher. The emotional changes for Cynthia following her concussion lasted for several months, if not beyond that. Her mom noticed "severe emotional changes immediately after and probably for the first six months" following the concussion. She described Cynthia as a "raw nerve and overly sensitive . . . quick to react or scream with her sibling. She would just fly off the handle . . . no patience." It was a tough time for Cynthia following the concussion. Her mother shared, "At school, she really wasn't social, and at home she was irritated by family nonstop, us nagging her to catch up and do her homework. Literally, all weekend she worked with her homebound teacher." She summed it up when she shared:

> You see somebody working really hard and can take in all the information and then just how it's all bottled up inside her, and she can't do anything with it. She is certainly smart enough to, but she can't chunk it to do anything with it. I think . . . it brings her to inaction in decision making. It's like she can't decide what she wants to do with friends

> or decide if she is asked to do something. The only thing she knows that she wants to do is sail. That's it. It's like she wants to get back what she messed up.

Cynthia's mom picked up on the fact that Cynthia had a difficult time organizing her thoughts and expressing them and believed that Cynthia gets overwhelmed and worn out with all of the overthinking and processing of information.

Ms. Anderson also picked up on Cynthia's frustrations and could see that she was experiencing a "possible emotional problem." Ms. Anderson was able to talk with Cynthia about her injury and what was going on with her brain as it healed and reestablished synapses. This approach echoed Dr. Molfese's theory in dealing with concussions and the brain creating new networks as discussed in the literature review. Because Cynthia was taking biology that school year, Ms. Anderson was able to make the comparison of rebuilding synapses to a heart bypass, making a new pathway for blood to travel. She stated,

> Your brain had a pathway for this learning, but it's broken and now what we've got to do is reconnect and find another pathway in your brain. And then–voilà—it works. She would laugh and go, "My brain is like on bypass surgery."

During the interview with Ms. Anderson, it was apparent that she could have short discussions with Cynthia to help her better understand what was going on. She shared that she spent time helping Cynthia understand the idea that her struggles were not because of her, but because of what happened to her. She would tell Cynthia, "You're going to have to train your brain to do it a little differently."

Depression was a concern for Cynthia also. Even her friend Fran pick up on it: "There was one time when she wasn't allowed to come back to school yet, and she really was kind of depressed." She attributed this to Cynthia not being at school and being a "little low" as she was

going through her cognitive rest period. However, according to Cynthia's mom, this depression was situational and lasted longer than the cognitive rest period. Almost 11 weeks postinjury, Cynthia went to XYZ Hospital's neurology department. There she was diagnosed with PCS and depression. The doctor there wanted to put her on a strong medication for depression that both her parents and her local doctor did not feel was necessary. Cynthia's mom stated, "Our doctors here did not think that was the case. They thought she was just frustrated because her life had changed greatly."

There eventually came a turning point with this case. Approximately 22 weeks postinjury, Cynthia began taking medication for ADHD, and more than 24 weeks postinjury, Cynthia went to a well-known regional hospital that has a concussion center and saw a neuropsychologist. The medical data stated that with the medication, Cynthia was able to focus better and Cynthia's mother reported that her sensitivity and frustration levels were much lower. At that time, she was diagnosed again with PCS, but the doctor, who was also a basketball coach, had these words to share with Cynthia:

> I don't think you are depressed; I think you are frustrated. . . . You're not crazy; it happens to everybody. You are pissed off, you are frustrated, and you are mad because your life sucks and you can't do what you used to do.

According to her mom, Cynthia "was like, 'Yeah, he gets me. And ever since then . . . that was like a turning point. . . . That was like the blossoming of Cynthia."

Things did get better after this turning point. Her mother shared, "She has been better since. Emotionally she is still, I think, quick or reactive. Not as able to control her emotions. I think it's like an executive function thing is somehow impaired. But better over time." One of her teachers, Mr. O'Day, commented on her recovery, "She seems more able to communicate.

Better and socializes better. I know she has gone to a couple games and rides with my daughter to school." In her journal, it is evident that Cynthia understands what is going on: "I have to study a lot more and put in more effort now, but I've gotten used to it. I have to take more time away from the things I want to do."

Medication. One theme that came up from several sources was the use of medication to assist with Cynthia's return to the classroom and recovery. The homebound teacher, Ms. Anderson, shared, "I talked to mom a lot about that she is having a really hard time homing in on what is important. And she had talked to her doctors. Eventually, they put her on ADHD medication." When asked if she noticed any differences in Cynthia after she began this medication, she replied, "Yes, you could see where she could start to be able to home in on the things that were important." However, medication was not a quick fix or even an all-day fix. Cynthia's mother shared,

> Now she is on medication. She said it took everything that was like this in her brain [intertwining her fingers to demonstrate a jumbled mess] it was like this [straightening her fingers] and she can see each thing now. But that didn't last all day. I think writing and being at home, having a quiet spot and concentrating was a big challenge. And she would fall asleep. Her head would hurt too bad, and she couldn't do it, or she was so exhausted that she would fall asleep.

Even her friend Fran, who knew she was on medication, commented on how Cynthia was then able to complete sentences. She takes her to school most mornings and fortunately is comfortable enough with Cynthia that she will ask her if she has taken her medication when she picks her up. According to Fran, there were times that she needed a friendly reminder to take it. Cynthia's perspective on this is best seen in her journal entry:

> Ever since I started taking ADD medication school has been much easier. If I have a bad headache, I'm able to focus through it and get more out of class. Before I started taking it, I wouldn't be able to finish a sentence before getting completely distracted by something else. Thinking of words after my concussion was also very hard. This complicated writing answers or papers for class.

Research Question Responses

The results presented here are based on the analysis of data gathered through interviews and focus groups with friends, teachers, and parent, document analysis, and journaling by the primary participant. All data gathered are central to answering the research questions presented during this research study:

Central Question: *What is it like for a student-athlete to return to school after suffering a concussion*?

A. Subquestion: *How do these physical effects of a concussion affect the student-athletes' return academically*?

B. Subquestion: *What are the social implications for student-athletes in a school setting as they are dealing with symptoms of a concussion*?

C. Subquestion: *How are emotions, interactions with others, and participation in the academic environment affected by the concussion*?

Physical effects. Concussions can cause a variety of physical symptoms. In Cynthia's case, there were several for her to deal with as she returned to the school environment. As mentioned above, school being a struggle was a primary theme that was developed through the data. The need to develop a 504 plan and conduct a formal evaluation for Cynthia, demonstrated that the symptoms prolonged past a typical three-week recovery period.

One of the most significant and long-lasting physical symptoms that Cynthia suffered with was headaches. Cynthia, her mom, and the school nurse all saw firsthand how these headaches impeded her learning in the classroom. Other symptoms that seemed to go hand-in-hand were her dizziness and nausea. Emma, her friend, commented on their discussion about the dizziness. The girls differentiated the dizziness between "the room spinning" versus "like being on a boat, a never-ending boat."

Sensitivities to light and noise were mentioned by Ms. Anderson, Cynthia's friends and mom, and Cynthia herself. This sensitivity kept her from going to regular lunch with her friends. She stopped going to pep rallies and football games. It took almost two years before she went to a school football game again. Two years later, she still goes to a classroom for lunch instead of the cafeteria. It was unclear if this is by choice or if the noise and lights still bother her. Two of her friends discussed how she avoids crowded situations, and they can now judge when something may be overwhelming for her.

During interviews and one of the focus groups, several people mentioned that Cynthia could not finish sentences when she was talking and was slow to respond to others during her initial recovery period. Although these symptoms stem from a cognitive issue, it is worth mentioning here because they impeded her from communicating verbally and in writing. Another item to note is that she did lose her memory of math facts and began to reverse letters when she wrote.

Social implications. It is apparent that the concussion impacted Cynthia's social interactions. For weeks, she was at home for cognitive rest. During that time, friends would come to visit, but only for a short time. Cynthia recalled,

> For the weeks that I was not going to school, my friends would like come over and want to talk to me, and my mom would have to tell them to leave. I couldn't really have them there making too much noise.

Cynthia thinks that because she could not do things with some of her friends, that they "went and made other friends." She still had a few close friends who would check in with her and at times make plans that she could participate in.

When teachers were interviewed, they said that they did not notice any differences in her socially or with her interactions with peers. Many described her as being very quiet and shy in class even before the concussion. Here social life was impacted primarily outside of the classroom. One teacher, Mr. O'Day, whose daughter is a close friend of Cynthia's, did share that he felt that "she seems more able to communicate better and socializes better. I know she has gone to a couple games and rides with my daughter to school. She just seems to be doing better." This statement was made two years postinjury.

As mentioned in the theme development of social and emotional implications, Cynthia's social life was significantly impacted by this concussion. Her interview was conducted before the beginning of her junior year of high school, approximately one year and 10 months postinjury. At that time, she was very realistic in her assessment of what happened to her and how it has impacted her socially. There was some social rebuilding that had to happen, but as she commented in her journal, "All of the things that changed have become my new normal."

Emotions, interactions, and participation. Cynthia had many things to deal with during her recovery from her concussion. The emotional effects were discussed in the theme development of social and emotional implications. Both the social aspect and the emotional aspect of this concussion had a great impact on her interactions with others and her participation

in class. Cynthia was frustrated because she could not organize her thoughts, much less write them down or share them verbally with others. This alone would impact how she interacted with others during her freshman year of high school.

It is worth noting that several teachers interviewed taught her during her sophomore year. That year, Cynthia did not have a homebound teacher to assist her, and she chose not to use the accommodations in her 504 plan. The teachers from that school year shared that she was quiet but did participate in class and appeared to interact with others in a normal fashion. Many of these sentiments were echoed by the teachers that she had during her freshman year of high school.

Summary

As a result of research on the questions presented in this study, the data produced several themes on this concussed student and her return to the academic setting. Throughout all the data, it is very evident that the most prominent theme was the struggle with Cynthia's return to the school setting. It was also evident that the presence of Ms. Anderson as a homebound instructor was a blessing, as she was an important factor in Cynthia's recovery and successful completion of her freshman year of high school. No one can ignore the tremendous impact of this concussion on Cynthia's social and emotional wellbeing, as it affected all aspects of her life during the recovery process. The analysis of this data produced strong, applicable themes that can provide valuable information on what it is like for a concussed student to return to the classroom.

CHAPTER FIVE: CONCLUSION

Overview

The purpose of this qualitative case study was to explore how a high school student-athlete coped as she returned to the learning environment following a concussion. The case study has produced findings to the research questions previously presented. This chapter will provide these as well as a discussion of the significance of this study as it relates to prior empirical and theoretical research conducted about concussed students returning to the classroom, followed by the empirical, theoretical and practical implications of the findings and recommendations for various groups. Finally, the delimitations and limitations will be discussed followed by the recommendations for future research on concussed students and their return to the classroom.

Summary of Findings

The findings presented here are derived from interviews, focus groups, data analysis, and personal journaling from the primary case study participant. The data collected answered the central research question of *What is it like for a student-athlete to return to school after suffering a concussion?* These data also were relevant to the subquestions that addressed the physical, social, and emotional aspects of returning to school following a concussion.

In the analysis of the subquestion *"How do the physical effects of a concussion affect the student-athlete's return to the classroom?*" the data showed that the most impactful physical symptom for this case was headaches. It was not clear if the headaches stemmed from stress or overcognition, but they were a primary impediment to the student's ability to attend class on a regular basis. Also present were nausea, dizziness, and sensitivity to light and sound. These symptoms kept Cynthia from participating in class, lunch, and extracurricular activities.

Cynthia's journal revealed the problems she had with missing several weeks of school and trying to go back when she still had headaches and could not focus. She shared how her headaches impeded her learning in class. Projectors were hard for her to look at, and trying to watch required videos for class was difficult due to not being able to focus on screens for any length of time. It appeared that the headaches were exacerbated by visual demands.

As the data for the subquestion "*What are the social implications for student-athletes in a school setting as they are dealing with symptoms of a concussion?*" were disseminated, it became apparent that the time that Cynthia was on cognitive rest impacted her socially, taking her away from interacting with friends and classmates. Several of her friends would try to visit during this time, but they were very limited visits. Cynthia felt that her friends had made new friends and she had lost some of the connection that they once shared. Her teachers felt that she was still interacting with others in the classroom in an acceptable manner. It appears that most of the social impact was outside of the classroom but still affected Cynthia.

The data addressing the subquestion "*How are emotions, interactions with others, and participation in the academic environment affected by the concussion?*" demonstrated that the emotional implications from this concussion were not an issue in the school setting. However, they were present at home, with the homebound teacher, and with Cynthia herself. Cynthia's mom discussed how following the concussion Cynthia was "irritated by family nonstop." She was very sensitive, short with her siblings, and frustrated with her parents always trying to make sure she was keeping up with school. The homebound teacher also recognized that she was frustrated and experiencing some emotional problems. Cynthia's life had changed, and she did not understand why. The doctors at one hospital diagnosed her with depression, and her friends reported that she was a little depressed. This concussion had a significant effect on her

emotionally and presented issues with her interactions with her family and limited her interactions with family for a short while.

Although the research questions did not address the cognitive effects of the concussion, they are important to note here, as the data produced a strong connection between the concussion and cognitive symptoms. Cynthia's friends were the ones to bring this information to light. Cynthia could not complete sentences for several weeks following her concussion. It is possible that this cognitive effect lasted until she began taking ADHD medication approximately 22 weeks postinjury. The lack of ability to verbalize her thoughts also was evident in her writing and school performance. She could not pull her ideas together effectively to write more than one paragraph at a time, according to her homebound teacher and her mom.

Discussion

Cynthia's recovery can be linked back to the literature review and various studies conducted on concussed student-athletes and their road to recovery. In the following discussion, the data will connect to previous studies, demonstrating corroboration of information, extending information, and adding new contributions to the research conducted on concussed student-athletes as they return to the classroom.

Empirical Literature Discussion

Much of the empirical literature included the physical symptoms suffered by a concussed athlete. This particular case study participant did suffer physical symptoms previously reported by other studies: headaches (CDC, 2015b; Choe & Blume, 2016; Davies & Bird, 2015; Gagnon et al., 2005; Ransom et al., 2015; Zirkel & Brown, 2015), nausea, dizziness (CDC, 2015b; Davies & Bird, 2015; Gagnon et al., 2005; Zirkel & Brown, 2015), sensitivity to light and noise (CDC, 2015b; Davies & Bird, 2015; Zirkel & Brown, 2015), and fatigue or feeling tired (CDC,

2015b; Zirkel & Brown, 2015). Although these reports and studies also listed other symptoms, they were not reported in this study to be a factor in the return to the classroom.

Cynthia suffered headaches for an extended period and was still affected by them over a year postinjury. Through her journal, Cynthia reported that her "headaches got in the way of . . . learning." Choe & Blume (2016) discussed a possible link between prolonged recovery and headaches in females. In Cynthia's case, this could be a possible link to the cause of her headaches. Headaches that Cynthia continuously suffered did affect how long she could stay in a classroom and how often she needed to return to the nurse's station for rest. Davies and Bird (2015) reported that symptoms that persist for an extended period could lead to long-lasting academic consequences. Ransom et al. (2015) cited other qualitative studies that reported that postconcussive symptoms would impede academic performance. This was the case for Cynthia as she tried to successfully complete her freshman year of high school.

The CDC (2015b) stated that immediate rest is critical in helping the brain in recovering from an injury, and Williams et al. (2015) stated that the lack of immediate rest could exacerbate symptoms. In Cynthia's case, she did not have immediate rest following her injuries. Instead, she returned to school on the Monday following her second hit to the head and remained in school until the headaches prompted a second trip to the nurse on Friday. For four days, she attempted to keep up with her regular schedule at school. She lacked the initial rest that is indicated as a necessity in previous research. Her rest began exactly a week following the first injury.

The other concerning occurrence in this case is the fact that Cynthia had two blows to her head within two days. As previously discussed in the literature review, repeated concussions "can slow recovery or increase the likelihood of having long-term problems" (Sarmiento et al.,

2010, p. 113), or cause permanent brain damage or death (Davies & Bird, 2015). Eisenberg et al.'s (2013) study shows that the shorter the time between concussions, the greater the duration of symptoms. In this case study, Cynthia possibly suffered two concussions within two days. Because of the time between injury and diagnoses by the local doctor (14 days), it is unknown if both hits to the head caused a concussion or if only one caused a concussion. Either way, it is evident that Cynthia suffered a concussion and suffered postconcussive symptoms for an extended period.

According to this case study, Cynthia was affected socially by the concussion that she suffered. The extended amount of cognitive rest kept her from participating in the things that she loved: sailing and hanging out with friends. As previously stated, Cynthia felt that her friends had moved on and forged new friendships because she was not available for months to do things. She was limited to time on her phone. Her mother also echoed this concern because Cynthia was limited in what she could do to ensure that she received the cognitive rest that was needed. This case supports DeMatteo et al.'s (2015) concerns that being out of school affects "social isolation and may contribute to depression and/or anxiety" (p. 783).

As Cynthia was diagnosed with depression at approximately 11 weeks postinjury. Cynthia's mom researched the medication prescribed and consulted with the local doctor managing Cynthia's case, and they decided that her depression was situational and that the medication had side effects that were not in Cynthia's best interest. Her symptoms and time away from school interfered with her participation and her interactions with peers as DeMatteo et al. (2015) reported in his research. This finding also supports Popoli et al.'s (2014) study, which found that symptoms can contribute to anxiety about being separated from friends and accomplishing school work.

With Cynthia's recovery accruing over an extended period, it was emotionally straining not to know when recovery would end. A concussion is an invisible injury, and it is less likely that one would experience the feeling of optimism during recovery (Mainwaring et al., 2012). Although Eisenberg et al. (2014) reported that emotional symptoms develop later in recovery, Cynthia's mom reported that they occurred soon following the concussion. She was short with her siblings and quick to overreact to comments made by her parents. Cynthia experienced much frustration during her recovery.

One area not specifically addressed through the research questions that presented itself throughout the study was Cynthia's cognitive functioning. The research discussed adverse cognitive outcomes of a concussion to include memory difficulties and slow reaction time (DeMatteo et al., 2015), along with feeling foggy or hazy, having difficulty concentrating, being unable to maintain focus, feeling slowed down, forgetting recent information or conversations, repeating questions, and experiencing slowness in responses (Daveshvar et al., 2011; Davies & Bird, 2015; Halstead et al., 2010; Zirkel & Brown, 2015). According to friends, Cynthia could not finish her sentences. This goes beyond not remembering recent information or conversations as mentioned before. From the data gathered, it appears that her processing of information was impaired. She showed difficulty expressing herself verbally and in her writing. Physical symptoms are much easier to detect than cognitive ones (Popoli et al., 2014).

One interesting item that this study addresses that has not been previously studied is the use of ADHD medication and its impact on Cynthia's recovery. Once she began the medication, she reported to her mom that information that had been jumbled became much clearer. Through her journal, Cynthia shared that school was much easier and she could focus better in class. Ms. Anderson, the homebound teacher, stated how Cynthia was able to focus more on her work and

make sense of what was being asked of her. Even Cynthia reported that once she started this medication, she could focus better and push through her headaches to stay in class. No other report found addressed the use of ADHD medication to assist students in their recovery. This is an area that needs further research and development.

Theoretical Literature Discussion

Several theories that relate to concussed students and their return to the classroom were presented earlier in the theoretical framework review. They were chosen because they related to studies on concussed athletes. As the research was conducted and data were analyzed, the theories would present themselves that related directly to this case study. The fact that Cynthia did not report the second concussion could fall within the TPB or social norm theory. Cynthia's case relates to TPB because she did not report the second hit to the head. It is unclear if it was because of the possible negative consequences for her in her desire to finish sailing that weekend in the regatta, which feeds into social norm theory, which addresses the lack of reporting the hit to the head and continuing with her competition. Kroshus, Garnett, Hawrilenko, et al. (2015) combined these theories with Bandura's social learning cognitive theory, bringing in the idea that any perceived norms that a student-athlete has an effect on their reporting behavior.

The case study presented here shows a student who reported her first hit to her head to her parents but did not report the second hit to the head to anyone. The only person who may have known was the crew in the boat. None of the data show that she would have reported it. To change this type of practice among high school student-athletes, the triadic reciprocal causation as Miller (2011) calls it, could change the student perceived norms as presented by Kroshus, Garnett, Hawrilenko, et al. (2015). These norms are based on the person, behavior, and

environment. This study shows that these theories can be expanded to include high school students and their reporting behaviors of concussions.

Implications

Empirical Implications

The empirical implications for this study are apparent: There is a need for further research to be conducted with high school–aged students. In this case study, it is apparent that although the research questions were separated into physical, social, and emotional categories, the data produced were interwoven throughout all three domains. To have a complete understanding of students returning to the classroom, one would need to look at all aspects of the student comprehensively, studying the whole child.

The one thing that stands out that assisted Cynthia in her recovery that needs more attention in the realm of empirical research is the use of ADHD medication. The start of this medication, at approximately 23 weeks postinjury, stands out as a major turning point during the journey to recovery. It makes one wonder if this was implemented earlier in her recovery, would the academic struggles have been lessened for her earlier? This is an area that should be researched further and with a partnership between the medical and academic realms. The information concerning its success for failure should be shared among all doctors who would work with concussed students as patients.

Theoretical Implications

Further development on concussion reporting theories needs to be conducted, being more inclusive of the high school–aged student-athlete. Although there is much research on concussion reporting information and theories, a stronger focus is needed in the education realm and with educators. It was not stated by any teacher that something was going on with Cynthia

the week she was at school following her injury. The only thing mentioned was that she was there and then she was not. It was the school nurse that recognized that Cynthia might have more going on than just a headache. If these educators had more concussion knowledge, would they have been able to pick up on her symptoms and behavior in class to quickly ascertain that she had something going on? In no way is it the responsibility of educators to always be assessing for concussions. The responsibility ultimately goes back to the student and parents. However, if adequately trained in concussion symptoms and protocol, perhaps a better understanding could be shared by all.

Practical Implications

After completing this study, it is evident that the many calls for improvement in the area of concussion protocol for students returning to the classroom are well founded. In this case study, there was a lack of communication specific to the concussion between many parties associated with this case. Some of the teachers felt that they should have been made aware of the situation by Cynthia's parents. The parents felt that once they reported it to the school, that all parties within the school should have been notified and made aware of the situation. A better path of communication should be developed to share relevant information concerning students when they are out for extended periods, or perhaps basic expectations can be established for better communication between people. On one side, there are HIPAA and FERPA concerns with sharing information. However, on the flip side, educators are expected to not share this type of information outside of the faculty and staff directly associated with this student.

At the district level, there should be policies in place to assist students when they return to the classroom. The policy committee should consist of stakeholders who would have valuable input from working previously with concussed students, including, but not exclusive to, parents,

students, teachers, coaches, athletic directors, school nurses, guidance counselors, and anyone having experience working with concussed students. The policy developed should be primarily concerned with how to best assist concussed students with their return to the classroom.

Another practical takeaway from this study is the need for concussion protocol to integrate better the medical aspects of a concussion with the educational demands that are placed on a student. In the teacher focus group, it was discussed that assigning a homebound teacher to a student with a concussion was not protocol. Clarification was made that Cynthia had this service because of the number of days that she missed. Cynthia successfully completed her freshman year because her homebound instructor had previously worked with TBI students and knew of strategies and techniques to use with her. Cynthia was clear in her journal that she would have not been able to complete the school year without Ms. Anderson. I would propose that if any student is out of school with a concussion, they should be afforded the services of a homebound instructor to assist them in getting caught up with work missed. Another option may to be assigned to a teacher mentor who could work with the student to ascertain that their cognitive abilities are not such to warrant further cognitive testing available from the school district.

The school associated with this study and other schools across the country use IMPACT testing to evaluate impacts on students if they suffer a hit to the head. This is useful when determining if further examination is needed for a possible concussion, which is extremely important. However, with a concussion being an invisible injury, the indications of when a student is ready to go back to a full-time academic schedule is unclear. In this area of cognitive functioning, there should be some assessment to use with students to determine or better estimate if they can cognitively function in the classroom. Many researchers are conducting significant

research in the area of neural networks (Molfese, 2015) and the balancing of neurochemicals (McAvoy, 2012). Davies and Bird (2015) built upon the theory of unstable neurochemicals and called for school personnel to realize the academic consequences of a concussion. It appears that there is a large disconnect between the medical world of concussions and the academic world of concussions, yet they both deal with the same person trying to get their life back to a state of normalcy.

Delimitations and Limitations

Delimitations for this case study included limiting the boundaries of the study to a student-athlete who has suffered a concussion and has had a recovery that has lasted beyond the typical period. This decision was made based on the lack of empirical studies that have been conducted on high school students returning to the classroom following a concussion. Most research is on the return to the playing field and not to the classroom. As previously mentioned, students are a population that requires further study, as their primary job during this stage of life is going to school to learn (DeMatteo et al., 2015). By narrowing the field to a student-athlete with an mTBI or concussion, this study focused on the issues and concerns that surround an injured student-athlete in the academic environment. The student-athlete chosen was coming out of the recovery phase and experiencing minor postconcussive symptoms as compared to immediately following her concussion. The timing of recovery allowed for a more accurate account of the case, as it was in recent memory for this high school student-athlete.

Limitations with this study included the identifying a willing participant of high school age and gaining both consent and assent from the participant and her parents. Gaining permission from the school district and participants presented time issues due to the age of the students that were being sought to participate in this study. Once the primary participant was

confirmed, it took time to recruit secondary participants of high school age to be interviewed and participate in focus groups. With everyone having a busy schedule outside of school hours, this was the most substantial limiting factor with collecting data for this case.

Recommendations for Future Research

Future research could take many directions from the case study presented here. Conducting a replicated case study with two or more students who are suffering extended postconcussive symptoms would allow for a cross-case analysis for more in-depth data on students returning to the classroom following a concussion. Replication could even be more defined by narrowing down the sport related to the injury. In this case study, the injury occurred from an impact to the head by a boom on a sailboat. In the world of sailing competitively, there is discussion on the required use of helmets at all age levels. A quantitative study on the required use of helmets on various competitive groups from youth to the US Sailing team, along with a qualitative inquiry as to the background of requiring them, would add further data to concussions in the world of sailing.

The research data from the medical field indicated that immediate rest following a concussion is necessary for recovery. In the case presented here, several days passed before the student reported the second concussion and shared the severity of the symptoms that she was experiencing. She tried to immediately return to a normal routine without taking the rest period that is recommended by medical journals mentioned previously in the literature review. A quantitative study with a focus on the correlation of time between concussion and beginning of cognitive rest and the length of a student being symptomatic could potentially produce information and confirmation of the importance of immediate cognitive rest, which could guide further development of concussion protocols among athletes or anyone who suffers a concussion.

In conjunction with the cognitive rest period, it may be beneficial for doctors, coaches, athletic trainers, parents, and students to have an idea of the severity of the concussion to determine how much initial cognitive rest is necessary. A potential study could include an assessment such as or like the IMPACT assessment. The athletic trainer made the comment to Cynthia's mom that her scores on the IMPACT assessment were some of the worst she had seen. Tracking students' scores and recovery times may produce a general idea of recovery time necessary, along with the appropriate initial cognitive rest.

Beyond knowing the severity of the concussion, it would be beneficial if there was a quick way of assessing cognitive readiness to return to the classroom without extensive cognitive testing. In Cynthia's case, her return to the classroom seemed to be based on trial and error. According to the research, this exertion of cognitive processes could have potentially exacerbated her symptoms and extended the needed recovery time. Even one of her teachers said that she was not sure that Cynthia should have been back in the classroom, but "that was not [her] call to make." A better RTL process needs to be put into action for concussed students.

Summary

This study of one student returning to the classroom following a concussion has shed much light on how symptoms affect just being in the classroom and how these symptoms can inhibit understanding of the material presented. It is a struggle for a student to learn while suffering postconcussive symptoms and experiencing cognitive processing issues. Cynthia's journey back to the classroom brings to light the need for better communication between all parties involved with a recovering concussed student, along with the need of some type of cognitive assessment to determine when the student can return and be successful in the classroom. The need to reassess concussion protocol will always be present because we can

always grow from mistakes and create a more positive journey to the classroom for concussed students. One area to further analyze is the need, or possible requirement, for homebound instruction or intermittent homebound instruction when the student is prepared to return to the classroom on a part-time to full-time basis to better meet the needs of the students as they return to the classroom.

Helping students learn is a passion of many educators. This topic will continue to be researched, and protocols will continue to be reviewed and changed as information is learned on how to assist concussion students in the classroom best. We must always keep in mind that students are: children first, still growing and needing guidance; students second, needing to learn and grow academically; and athletes third, developing and growing their physical strength. It is a special calling to teach children and watch them grow in knowledge. However, when an injury challenges that process, educators should be armed with the knowledge on how to best serve students who have been injured, including those with the invisible injury of a concussion.

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APPENDIX A: Permission to Conduct Study

LIBERTY UNIVERSITY.
INSTITUTIONAL REVIEW BOARD

May 31, 2018

Sheila Benton
IRB Approval 3211.053118: A Case Study Examining Student-Athletes Returning to the Classroom After Suffering a Concussion or Mild Traumatic Brain Injury

Dear Sheila Benton,

We are pleased to inform you that your study has been approved by the Liberty University IRB. This approval is extended to you for one year from the date provided above with your protocol number. If data collection proceeds past one year, or if you make changes in the methodology as it pertains to human subjects, you must submit an appropriate update form to the IRB. The forms for these cases were attached to your approval email.

Thank you for your cooperation with the IRB, and we wish you well with your research project.

Sincerely,

[redacted]

G. Michele Baker, MA, CIP
Administrative Chair of Institutional Research
The Graduate School

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APPENDIX B: Permission Letters

Request for Permission – [redacted]

March 2018

[redacted]
Superintendent
[redacted]

Dear [redacted]:

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for a doctoral degree. The title of my research project is A Case Study Examining Student-Athletes Returning to the Classroom after Suffering a Concussion / Mild Traumatic Brain Injury. The purpose of my research is to explore how a high school student-athlete copes as they return to the learning environment following a concussion; providing a detailed description of this phenomenon, providing in-depth knowledge, possible explanations and evaluation of the qualitative case study proposed.

I am writing to request your permission to conduct my research in [redacted] at [redacted], use staff to identify potential participants for this study, contact member of the faculty and staff to participate in this study, conduct an environmental analysis of various places in the building, and access records and data with signed parental and student permission.

Participants and student participants will be asked to contact me for an interview and to take part in a focus group. Parents and student participants will be presented with informed consent/assent information, and faculty/staff participants will be presented with informed consent before participating. Taking part in this study is completely voluntary, and participants are welcome to discontinue participation at any time.

Thank you for considering my request. If you choose to grant permission, please provide a signed statement on official letterhead indicating your approval. Should you have any questions, please do not hesitate to contact me directly

Sincerely,

Sheila J. Benton, NBCT, EdS

[redacted]

[redacted]

Request for Permission – [redacted]

March 2018

[redacted]

Dear [redacted]

As a graduate student in the School of Education at Liberty University, I am conducting research as part of the requirements for an Educational Doctoral degree. The title of my research project is A Case Study Examining Student-Athletes Returning to the Classroom after Suffering a Concussion / Mild Traumatic Brain Injury. The purpose of my research is to explore how a high school student-athlete copes as they return to the learning environment following a concussion; providing a detailed description of this phenomenon, providing in-depth knowledge, possible explanations and evaluation of the qualitative case study proposed.

The case is to be built around a student at your school who has agreed to participate in this study with consent from their parents. This student will be asked to identify members of your faculty and staff who have knowledge of him or her as they have re-entered the classroom. Other students will be identified, and informed consent/assent will be delivered to the student and their parents/guardians outside of the school setting. No student will be approached or included in this study unless prior consent/assent has been obtained.

I am writing to request your permission to conduct my case study research at [redacted], [redacted]. I am asking assistance with the identification of a student who has suffered a concussion and has experienced symptoms for longer than three weeks. I will provide a letter and consent/assent information for parent and student review and ask the school to deliver this to the student. Once parents have contacted me and consent has been granted, I would ask for access to members of your faculty and staff to invite them to participate in my study. Any documentation/artifacts requested will have written permission from parent and student. I will also require the use of an office or conference room with windows for persons to view, but not hear the interviews being conducted. This is a safety measure for students and all who are involved with this study.

Faculty and staff who are willing to participate will be asked to contact me to schedule an interview and to participate in a focus group set up only for faculty and staff. The data will be used to develop an in-depth description to better understand what it's like for a student who has suffered a concussion to return to the learning environment. Participants will be presented with informed consent information prior to participating. Taking part in this study is completely voluntary, and participants are welcome to discontinue participation at any time.

Thank you for considering my request. If you choose to grant permission, please provide a signed statement on approved letterhead, with appropriate signatures, indicating your approval. Please feel free to contact me with any questions or concerns.

Sincerely,

Sheila J. Benton, NBCT, EdS

[redacted]

[redacted]

Sample Permission Letter

[Please provide this document on official letterhead or copy and paste into an email. The letter/email must be returned to the researcher requesting permission.]

March 2018

Mrs. Sheila Benton
Student/Researcher, Liberty University
[redacted]

Dear Mrs. Benton

After careful review of your research proposal entitled A Case Study Examining Student-Athletes Returning to the Classroom after Suffering a Concussion / Mild Traumatic Brain Injury, we have decided to grant you permission to conduct your study at [redacted] in [redacted].

Check the following boxes, as applicable:

☐ Data will be provided to the researcher stripped of any identifying information.

☐ I/We are requesting a copy of the results upon study completion and/or publication.

Sincerely,

[redacted]

APPENDIX C: Recruitment Letters

Recruitment Letter – Primary Participant (Under 18) and Parents

March 2018

To: Primary Participant (Under 18) and Parents

Dear Parents of Potential Primary Participant,

As a graduate student in the School of Education at Liberty University, I am conducting research as a part of the requirements for an Educational Doctoral degree. The title of my research is "A Case Study Examining Student-Athletes Returning to the Classroom after Suffering a Concussion/Mild Traumatic Brain Injury," with a focus on what it's like to return to the classroom after suffering a concussion while experiencing symptoms beyond a three-week period. The study is a case study based on one student who has suffered a concussion. Other participants will include parent(s), friends, teachers, coaches, and other school personnel as identified by your child. I am writing to invite you and your child to participate in my study.

You child was selected as a possible participant because he or she is under the age of 18, attends high school, has recently suffered a concussion, is experiencing the recovery time lasting longer than three weeks, and has no prior academic accommodations. Parents or guardians who are in direct care of the child are also invited to participate in this study.

If you agree to allow your child/student to be in this study, I would ask him or her to do the following things:

1. Set up a time for an initial one-on-one interview to ask questions to gain his or her perspective of returning to the classroom. This interview will be audiotaped and transcribed using a pseudonym for your child, to keep their identity confidential in the reporting of the findings. The primary questions of this study will limit this interview, and the time involved will depend on how in-depth the answers are. This procedure should last approximately 30 minutes. Follow-up interviews will also be conducted to allow a participant to add anything to the study that that is deemed important.
2. Provide a list of 5 to 7 friends or classmates who would be interested in participating in this study, and provide a class schedule with names of teachers, coaches, school nurse, or any faculty or staff who may be willing to participate. Participant names will be kept confidential with assigned pseudonyms. No real names of people or places will be shared in the findings and reports. This step should take about 10 minutes.
3. Keep a journal for 15 minutes daily for three weeks to provide any information that is deemed relative to a participant's return to the classroom. This will be written in a journal provided to the participant to document anything associated with his or her concussion and returning to the classroom. The information provided will be labeled with the child's assigned pseudonym and transcribed into a word document, and the journal will be destroyed with other physical data at the end of the study.
4. Participate in a review of the transcription of both interviews to check for accuracy. This step should only take about 20 minutes.

If you agree to be in this study, I would ask you to do the following things:

1. Agree to the release of limited health and education information as specified on the Release of Limited Health Information form and Release of Educational Information form. The health information will include medical verification of sustaining a concussion, date of concussion, date of diagnosis, and documentation that recovery has lasted longer than three weeks for the primary participant in this case study. The educational information will include information about accommodations, grades, attendance, communication, and use of school resources. Please see attached form for a detailed list.
2. Set up a time for an initial interview to gain your perspective of your child as he or she has returned to the classroom. This interview will be audiotaped and transcribed using an assigned pseudonym (fake name) for you and your child, to keep identities confidential in the reporting of the findings. This procedure should last approximately 20 minutes.
3. Participate in a focus group including your child, yourself(selves), and other family members. The focus groups are divided into groups based on family, peers, and faculty/staff. Each group will discuss issues and needs that you have noticed about the case study student. You will be asked to share your perspective and respond to other group members' comments. The focus group will be recorded, transcribed with pseudonyms, and then deleted. The focus group discussion should last about 30 minutes.
4. Participate in a review of the transcription of interviews to check for accuracy. This step should only take about 15 minutes.

Your name and other identifying information will be requested as part of your participation, but the information will remain confidential. Your child's name and other identifying information will be requested as part of your child's participation, but the information will remain confidential.

For you and your child to participate, please contact me via email to confirm your interest and schedule an interview with your child. An informed consent/assent document is attached here. The consent/assent document contains additional information about my research; please review this document with your child, sign it, and return it to me before or at the start of the first scheduled interview.

Thank you for your consideration of my request. If you and your child participate, participating parents and child will receive a $10 gift card as a token of my appreciation.

Please do not hesitate to contact me with any questions.

Sincerely,

Sheila J. Benton, NBCT, EdS

Authorization of Release of Educational-Related Information

By executing the Authorization, I authorize the high school of attendance to disclose information and documentation concerning the student listed below as deemed necessary for a research study being conducted. Information will include interviews with faculty and staff, along with paper documentation directly pertaining to this study. This information will be released to Sheila J. Benton. This information may only be used for research being conducted by Sheila J. Benton. I understand that when this information is disclosed pursuant to the Authorization, that it may be re-disclosed and may no longer be protected by federal privacy laws. This Authorization will expire 1 year from the date that this Authorization is signed.

_____ _____

Signature of Individual Whose Information is to be disclosed Date

_____ _____

Signature of Parent or Guardian of Individual Date

_____ _____

Printed Name of Individual (Student) Printed Name of Parent/Guardian

Documentation to be requested:

- Confirmation of no prior academic accommodations:
  _____(School Official)
- Documentation showing current accommodations made in the academic setting for the above student.
  - *If no formal accommodations exist, teachers will be asked to construct a list of interventions, accommodations, or adjustments made in the classroom.
- Documentation of grades and attendance for one year prior to injury until most recent grades will be requested at the conclusion of field research.
- Documentation of visits to nurse's office following the concussion including times, duration, complaints, and outcomes of the visit.
- Documentation from guidance counselor, such as homebound documentation, etc.
- Any documentation that the athletic director, coach, or athletic trainer may have concerning the student and the injury.
- Any communication from anyone at the school concerning the effects of the concussion on the student.

*** All documentation will be coded with pseudonyms upon receipt by the researcher. Identifying information will be blacked out and converted to digital files, and hard copies will be destroyed.

Recruitment Letter – Primary Participant (18 years and older)

March 2018

To: Potential Primary Participant (18 years and older)

Dear Potential Primary Participant,

As a graduate student in the School of Education at Liberty University, I am conducting research as a part of the requirements for an Educational Doctoral degree. The title of my research is "A Case Study Examining Student-Athletes Returning to the Classroom after Suffering a Concussion/Mild Traumatic Brain Injury," with a focus on what it's like to return to the classroom after suffering a concussion while experiencing symptoms beyond a three-week period. The study is a case study based on one student who has suffered a concussion. Other participants will include parent(s), friends, teachers, coaches, and other school personnel as identified. I am writing to invite you to participate in my study.

You were selected as a possible participant because you have been identified as a high school student who has suffered a concussion, experienced symptoms for longer than a three-week period, and who does not have documentation of prior academic accommodations.

If you are 18 years of age or older and agree to be in this study, I would ask you to do the following things:

5. Set up a time for an initial one-on-one interview to ask questions to gain his or her perspective of returning to the classroom. This interview will be audiotaped and transcribed using a pseudonym for your name to keep your identity confidential in the reporting of the findings. The primary questions of this study will limit this interview, and the length will depend on how in-depth the answers are. This procedure should last approximately 30 minutes. Follow-up interviews will also be conducted to allow participants to add anything to the study that that is deemed important.
6. Provide medical diagnoses of a concussion and the date which the concussion occurred and agree for the release of information from the high school as specified on the Release of Educational Information form. Including confirmation of no prior formal accommodations, adjustments or accommodations that teachers made after the concussion, visits to the nurse's office, visits to guidance concerning your concussion, and any documentation that the school, teachers, or coaches shared with you.
7. Provide a list of 5 to 7 friends or classmates who would be interested in participating in this study, and provide a class schedule with names of teachers, coaches, school nurse, or any faculty or staff who may be willing to participate. Participant names will be kept confidential with assigned pseudonyms. No real names of people or places will be shared in the findings and reports. This step should take about 10 minutes.
8. Keep a journal 15 minutes daily for three weeks to provide any information that is deemed relative to your return to the classroom. This will be written in a journal provided to you to document anything associated with your concussion and returning to

the classroom. The information provided will be labeled with the your assigned pseudonym and transcribed into a word document, and the journal will be destroyed with other physical data at the end of the study.

9. Participate in a review of the transcription of both interviews to check for accuracy. This step should only take about 20 minutes.

If you agree to be in this study, I would ask your parents to do the following things:

5. Set up a time for an initial interview to gain their perspective on you as you have returned to the classroom. This interview will be audiotaped and transcribed using an assigned pseudonym (fake name) for you and your parent(s) to keep identities confidential in the reporting of the findings. This procedure should last approximately 20 minutes.
6. Participate in a focus group including you, your parents, and other family members. The focus groups are divided into groups based on family, peers, and faculty/staff. Each group will discuss issues and needs that they have noticed about you. You and your parents will be asked to share your perspective and respond to other group members' comments. The focus group will be recorded, transcribed with pseudonyms, and then deleted. The focus group discussion should last about 30 minutes.
7. Participate in a review of the transcription of interviews to check for accuracy. This step should only take about 15 minutes.

All data collected will be coded with a pseudonym in place of your name. Your name and other identifying information will be requested as part of your participation, but the information will remain confidential.

For you to participate, please contact me via email to confirm your interest and schedule an interview. An informed consent document is attached here. The consent document contains additional information about my research; please review this document, sign it, and return it to me before or at the start of the first scheduled interview.

Thank you for your consideration of my request. If you participate, you will receive a $10 gift card as a token of my appreciation.

Please do not hesitate to contact me with any questions.

Sincerely,

Sheila J. Benton, NBCT, EdS

[redacted]

Recruitment Letter – Secondary Participants (siblings, friends, and classmates under 18)

March 2018

To: Potential Secondary Participant and Parent

Dear Parent of Potential Participant,

As a graduate student in the School of Education at Liberty University, I am conducting research as a part of the requirements for an Educational Doctoral degree. The title of my research is "A Case Study Examining Student-Athletes Returning to the Classroom after Suffering a Concussion/Mild Traumatic Brain Injury," with a focus on what it's like to return to the classroom after suffering a concussion while experiencing symptoms beyond a three-week period. The study is a case study based on one student, _____ who has suffered a concussion. Other participants will include parent(s), friends, teachers, coaches, and other school personnel as identified by _____. I am writing to invite your child to participate in my study.

You child/student was selected as a possible participant because he or she is a sibling, friend, or classmate of _____.

If your child/student is under 18 years of age and if you agree to allow your child/student to be in this study, I would ask him or her to do the following things:

1. Set up a time for an initial interview to gain his or her perspective of the primary student returning to the classroom. This interview will be audiotaped and transcribed using assigned pseudonyms, to keep identities confidential in the reporting of the findings. This procedure should last approximately 20 minutes.
2. Participate in a focus group. The focus groups will be divided into groups based on family, peers, and faculty/staff. Each group will discuss issues and needs that group members have noticed about the case study student. Participants will be asked to share their perspective and respond to other group members' comments. The focus group will be recorded, transcribed with pseudonyms, and then deleted. The focus group discussion should last about 30 minutes.
3. Participate in a review of the transcription of interviews to check for accuracy. This step should only take about 15 minutes.

All data collected will be coded with a pseudonym for your child. Your child's name and other identifying information will be requested as part of his or her participation, but the information will remain confidential.

For your child to participate, please contact me via email to confirm your interest and schedule an interview with your child. An informed consent/assent document is attached here. The consent document contains additional information about my research; please review the document with your child, sign it, and return it to me before or at the start of the first scheduled interview.

Thank you for your consideration of my request. If you decide to allow your child to participate, your child will receive a $10 gift card as a token of my appreciation.

Please do not hesitate to contact me with any questions.

Sincerely,

Sheila J. Benton, NBCT, EdS

[redacted]

Recruitment Letters – Secondary Participants (18 years and older)
(Parents of non-minor primary participant, siblings 18 years and older, peers 18 years and older, faculty/staff 18 years and older)

March 2018

To: Potential Secondary Participant

Dear Potential Participant

As a graduate student in the School of Education at Liberty University, I am conducting research as a part of the requirements for an Educational Doctoral degree. The title of my research is "A Case Study Examining Student-Athletes Returning to the Classroom after Suffering a Concussion/Mild Traumatic Brain Injury," with a focus on what it's like to return to the classroom after suffering a concussion while experiencing symptoms beyond a three-week period. The study is a case study based on one student, _____, who has suffered a concussion. Other participants will include parent(s), sibling(s), friends, teachers, coaches, and other school personnel as identified by _____. I am writing to invite you to participate in my study.

You were selected as a possible participant because you were identified as being a sibling, friend, teacher, coach, or other school personnel who knows the primary participant in this case study.

If you are 18 years of age or older and agree to be in this study, I would ask you to do the following things:

1. Set up a time for an initial interview to gain your perspective of the primary student returning to the classroom. This interview will be audiotaped and transcribed using assigned pseudonyms to keep identities confidential in the reporting of the findings. This procedure should last approximately 20 minutes.
2. Participate in a focus group. The groups will be divided into groups specific to family, peers, and faculty/staff. Each group will discuss issues and needs that group members have noticed about the case study student. Participants will be asked to share their perspective and respond to other group members' comments. The focus group will be recorded, transcribed with pseudonyms, and then deleted. The focus group discussion should last about 30 minutes.
3. Participate in a review of the transcription of interviews to check for accuracy. This step should only take about 15 minutes.

All data collected will be coded with a pseudonym for your name. Your name and other identifying information will be requested as part of your participation, but the information will remain confidential.

To participate, please contact me via email to confirm your interest and to schedule an interview. A consent document is attached to this letter and contains additional information about my research. Please review the informed consent document, sign it, and return it to me before or at the start of the first scheduled interview.

Thank you for your consideration of my request. If you decide to participate, you will receive a $10 gift card as a token of appreciation.

Sincerely,

Sheila J. Benton, NBCT, EdS

[redacted]

APPENDIX D: Informed Consent/Assent

Informed Consent/Assent Forms – Parents and Primary Participant (Under 18)

PARENT/GUARDIAN CONSENT FORM

Understanding Concussions in the Classroom
Sheila J. Benton
Liberty University
School of Education

Your child/student is invited to be in a research case study of understanding what it is like to return to the classroom with a concussion. He or she was selected as a possible participant because he or she between the ages of 14 and 18, attends high school, has recently suffered a concussion, is experiencing the recovery time lasting longer than three weeks, and has no prior academic accommodations. Parents or guardians who are in direct care of the child are also invited to participate in this study. Please read this form and ask any questions you may have before agreeing to be in the study and to allow your child/student to be in the study.

Sheila J. Benton, a doctoral candidate in the School of Education at Liberty University, is conducting this study.

Background Information: The purpose of this study is to gain insights into how a student copes with returning to the learning environment after sustaining a concussion. I have chosen to study a student whose symptoms have lasted longer than three weeks to research a recovery period that would potentially provide valuable information on the needs and issues that surround a student as he or she returns to the learning environment.

Procedures for Student: If you agree to allow your child/student to be in this study, I would ask him or her to do the following things:

10. Set up a time for an initial one-on-one interview to ask questions to gain his or her perspective of returning to the classroom. This interview will be audiotaped and transcribed using a pseudonym for your child to keep his or her identity confidential in the reporting of the findings. The primary questions of this study will limit this interview, and the length will depend on how in-depth the answers are. This procedure should last approximately 30 minutes. Follow-up interviews will also be conducted to allow a participant to add anything to the study that is deemed important.
11. Provide a list of 5 to 7 friends or classmates who would be interested in participating in this study and provide a class schedule with names of teachers, coaches, school nurse, or any faculty or staff who may be willing to participate. Participant names will be kept confidential with assigned pseudonyms. No real names of people or places will be shared in the findings and reports. This step should take about 10 minutes.
12. Write in a journal for 15 minutes daily for three weeks to provide any information that is deemed relevant to his or her return to the classroom. This will be written in a journal provided to your child to document anything associated with his or her concussion and returning to the classroom. The information provided will be labeled with his or her

assigned pseudonym and transcribed into a word document, and the journal will be destroyed with other physical data at the end of the study.

13. Participate in a review of the transcription of both interviews to check for accuracy. This step should only take about 20 minutes.

Procedures for Parents: If you agree to be in this study, I would ask you to do the following things:

8. Agree to Release of Educational Information form (copy attached) and agree to provide a copy of the medical diagnosis verifying the existence of a concussion and the date of concussion.
9. Set up a time for an initial interview to gain your perspective on your child as he or she has returned to the classroom. This interview will be audiotaped and transcribed using an assigned pseudonym (fake name) for you and your child to keep identities confidential in the reporting of the findings. This procedure should last approximately 20 minutes.
10. Participate in a focus group divided into groups based on family, peers, and faculty/staff. Each group will discuss issues and needs that you have noticed about the case study student. You will be asked to share your perspective and respond to other group members' comments. The focus group will be recorded, transcribed with pseudonyms, and then deleted. The focus group discussion should last about 30 minutes.
11. Participate in a review of the transcription of interviews to check for accuracy. This step should only take about 15 minutes.

Risks and Benefits of being in the Study: The risks involved in this study are minimal, no more than you would encounter in everyday life. However, please note that if I am privy to information that triggers the mandatory reporting requirements for child abuse, child neglect, elder abuse, or intent to harm self or others, it must be reported. In this type of research, this must be disclosed as a risk to participants.

There are no direct benefits to participants.

The benefits to society include giving a voice to students who have suffered a concussion and are returning to the classroom, along with an in-depth description of the issues that may present themselves in this situation. This study aims to share the effects of a concussion beyond a simple list of symptoms, bringing a better understanding from the student to better understand how he or she copes when returning to the learning environment.

Compensation: Your child/student will be compensated for participating in this study with a $10 gift card once interviews and journaling have concluded. If your child does not complete the items listed above, he or she will not receive any compensation as another case would need to be chosen. Parent participant will also each receive a $10 gift card for their participation in this study.

Confidentiality: The records of this study will be kept private. In any sort of report I might publish, I will not include any information that will make it possible to identify a subject.

Research records will be stored securely, and only the researcher will have access to the records. I may share the data I collect from you or your child for use in future research studies or with other researchers; if I share that data that I collect about you or your child, I will remove any information that could identify you or your child, if applicable, before I share the data.

- Interviews will be conducted in an office or conference room at the high school or at the public library. The room will have a window where others may see in but cannot overhear the interview.
- Each participant will be assigned a pseudonym to protect his or her identity. Only the participant and I will know the assigned name. As all interviews are being transcribed, any use of a real name will be substituted with an assigned pseudonym.
- All electronic data will be stored on a password-protected computer and password protected external hard drive as a backup. All paper copies will be kept in a secure, locked safe with a combination only know by the researcher. Once an electronic copy has been secured (i.e., transcription, or scanning) the hard copies will be permanently destroyed through incineration. After three years, all electronic records will be deleted.
- Digital recordings will be transcribed to a Word file. The transcription will be conducted by myself as the researcher or by a professional transcriptionist who has signed a privacy and confidentiality agreement. These recordings will be deleted from the digital device used to record.
- Limits of Confidentiality: Due to the use of focus groups with other participants identified, I cannot assure participants that other members of the focus group will not share what was discussed with persons outside of the group.

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether or not to participate or allow your child/student to participate will not affect your or your child's current or future relations with Liberty University or his or her school. If you decide to participate or allow your child/student to participate, you or your child is free to not answer any question or withdraw at any time without affecting those relationships.

How to Withdraw from the Study: If you or your child/student chooses to withdraw from the study, you or your child/student should contact the researcher at the email address/phone number included in the next paragraph. Should you or your child/student choose to withdraw, data collected from you or your child/student, apart from focus group data, will be destroyed immediately and will not be included in this study. Focus group data will not be destroyed, but a parent's contributions to the focus group will not be included in the study if he or she chooses to withdraw.

Contacts and Questions: The researcher conducting this study is Sheila J. Benton. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at [redacted] or [redacted]. You may also contact the researcher's faculty advisor, Dr. Brian Yates at [redacted].

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher or her faculty advisor, you are encouraged to contact the Institutional

Review Board, 1971 University Blvd, Green Hall 1887, Lynchburg, VA 24515 or email at irb@liberty.edu.

Please notify the researcher if you would like a copy of this information to keep for your records.

Statement of Consent: I have read and understood the above information. I have asked questions and have received answers. I consent to participate and allow my child/student to participate in the study.

(NOTE: DO NOT AGREE TO PARTICIPATE OR ALLOW YOUR CHILD/STUDENT TO PARTICIPATE UNLESS IRB APPROVAL INFORMATION WITH CURRENT DATES HAS BEEN
ADDED TO THIS DOCUMENT.)

☐ The researcher has my permission to audio record me and my child/student as part of participation in this study.

_____

Signature of Minor Date

_____

Signature of Parent Date

_____

Signature of Investigator Date

Authorization of Release of Educational-Related Information

By executing the Authorization, I authorize the high school of attendance to disclose information and documentation concerning the student listed below as deemed necessary for a research study being conducted. Information will include interviews with faculty and staff, along with paper documentation directly pertaining to this study. This information will be released to Sheila J. Benton. This information may only be used for research being conducted by Sheila J. Benton. I understand that when this information is disclosed pursuant to the Authorization, that it may be re-disclosed and may no longer be protected by federal privacy laws. This Authorization will expire 1 year from the date that this Authorization is signed.

_____ _____

Signature of Individual Whose Information is to be disclosed Date

_____ _____

Signature of Parent or Guardian of Individual Date

_____ _____

Printed Name of Individual (Student) Printed Name of Parent/Guardian

Documentation to be requested:

- Confirmation of no prior academic accommodations:
  _____(School Official)
- Documentation showing current accommodations made in the academic setting for the above student.
  - *If no formal accommodations exist, teachers will be asked to construct a list of interventions, accommodations, or adjustments made in the classroom.
- Documentation of grades and attendance for one year prior to injury until most recent grades will be requested at the conclusion of field research.
- Documentation of visits to nurse's office following the concussion including times, duration, complaints, and outcomes of the visit.
- Documentation from guidance, such as homebound documentation, etc.
- Any documentation that the athletic director, coach, or athletic trainer may have concerning the student and the injury.
- Any communication from anyone at the school concerning the effects of the concussion on the student.

*** All documentation will be coded with pseudonyms upon receipt by the researcher. Identifying information will be blacked out and converted to digital files, and hard copies will be destroyed.

CONSENT FORM

Return to Learn: Understanding Concussions in the Classroom

Sheila J. Benton
Liberty University
School of Education

You are invited to be in a research study of understanding what it is like to return to the classroom following a concussion. You were selected as a possible participant because you have been identified as a high school student who has suffered a concussion, experienced symptoms for longer than a three-week period, and who does not have documentation of prior academic accommodations. If you are 18 years of age or older, please read this form and ask any questions you may have before agreeing to be in the study.

Sheila J. Benton, a doctoral candidate in the School of Education at Liberty University, is conducting this study.

Background Information: The purpose of this study is to gain insights into how a student copes with returning to the learning environment after sustaining a concussion. I have chosen to study a student whose symptoms have lasted longer than three weeks to research a recovery period that would potentially provide valuable information on the needs and issues that surround a student as he or she returns to the learning environment.

Procedures for Student: If you agree to be in this study, I would ask you to do the following things:

14. Set up a time for an initial one-on-one interview to ask questions to gain your perspective of returning to the classroom. This interview will be audiotaped and transcribed using a pseudonym for your name to keep your identity confidential in the reporting of the findings. The primary questions of this study will limit this interview, and the length will depend on how in-depth the answers are. This procedure should last approximately 30 minutes. Follow-up interviews will also be conducted to allow you to add anything to the study that that is deemed important.
15. Provide a list of 5 to 7 friends or classmates who would be interested in participating in this study and provide a class schedule with names of teachers, coaches, school nurse, or any faculty or staff who may be willing to participate. Participant names will be kept confidential with assigned pseudonyms. No real names of people or places will be shared in the findings and reports. This step should take about 10 minutes.
16. Keep a journal for 15 minutes daily for three weeks to provide any information that is deemed relative to your return to the classroom. This will be written in a journal provided to you to document anything associated with your concussion and returning to the classroom. The information provided will be labeled with your assigned pseudonym and transcribed into a word document, and the journal will be destroyed with other physical data at the end of the study.
17. Provide medical diagnoses of a concussion and the date which the concussion occurred and agree for the release of information from the high school as specified on the Release

of Educational Information form. Including confirmation of no prior formal accommodations, adjustments or accommodations that teachers made after the concussion, visits to the nurse's office, visits to the guidance counselor concerning your concussion, and any documentation that the school, teachers, or coaches shared with you.

18. Participate in a review of the transcription of both interviews to check for accuracy. This step should only take about 20 minutes.

Risks and Benefits of being in the Study: The risks involved in this study are minimal, no more than you would encounter in everyday life. However, please note that if I am privy to information that triggers the mandatory reporting requirements for child abuse, child neglect, elder abuse, or intent to harm self or others, it will be reported. In these types of research, this must be disclosed as a risk to participants.

There are no direct benefits to participants.

The benefits to society include giving a voice to students who have suffered a concussion and are returning to the classroom, along with an in-depth description of the issues that may present themselves in this situation. This study aims to share the effects of a concussion beyond a simple list of symptoms, bringing a better understanding from the student, to better understand how they cope when returning to the learning environment.

Compensation: You will be compensated for participating in this study with a $10 gift card at the end of the study once interviews and focus groups have concluded. If you do not complete the items above, you will not receive any compensation as another participant would need to be chosen for the study.

Confidentiality: The records of this study will be kept private. In any sort of report, I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records. I may share the data I collect from you for use in future research studies or with other researchers; if I share the data that I collect about you, I will remove any information that could identify you, if applicable, before I share the data.

- Interviews will be conducted in an office or conference room at the high school, or at the public library. The room will have a window where others may see in but cannot overhear the interview.
- Each participant will be assigned a pseudonym to protect his or her identity. Only the participant and I will know the assigned name. As all interviews are being transcribed, any use of a real name will be substituted with an assigned pseudonym.
- All electronic data will be stored on a password-protected computer and password protected flash drive as a backup. All paper copies will be kept in a secure, locked safe with a combination only know by the researcher. Once an electronic copy has been secured (i.e., transcription, or scanning) the hard copies will be permanently destroyed through incineration. After three years, all electronic records will be deleted.
- Digital audio recordings will be transcribed to a digital file. The transcription will be conducted by myself as the researcher or by a professional transcriptionist who has

signed a privacy and confidentiality agreement. These recordings will be deleted from the digital device used to record.

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Liberty University or your school. If you decide to participate, you are free not to answer any question or withdraw at any time without affecting those relationships.

How to Withdraw from the Study: If you choose to withdraw from the study, please contact the researcher at the email address/phone number included in the next paragraph. Should you choose to withdraw, data collected from you will be destroyed immediately and will not be included in this study.

Contacts and Questions: The researcher conducting this study is Sheila J. Benton. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at [redacted] or [redacted]. You may also contact the researcher's faculty advisor, Dr. Brian Yates at [redacted].

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, you are encouraged to contact the Institutional Review Board, 1971 University Blvd, Green Hall 1887, Lynchburg, VA 24515 or email at irb@liberty.edu.

Please notify the researcher if you would like a copy of this information for your records.

Statement of Consent: I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS IRB APPROVAL INFORMATION WITH CURRENT DATES HAS BEEN ADDED TO THIS DOCUMENT.)

☐ The researcher has my permission to audio-record me as part of my participation in this study.

_____

Signature of Participant Date

_____

Signature of Investigator Date

Informed Consent/Assent – Secondary Participant and Parent (Siblings and peers under 18)

PARENT/GUARDIAN CONSENT FORM

Understanding Concussions in the Classroom
Sheila J. Benton
Liberty University
School of Education

Your child/student is invited to be in a research study of understanding what it is like to return to the classroom with a concussion. He or she was selected as a possible participant because he or she is a sibling, friend, or classmate of a student that I am conducting a case study on. If your child/student is under 18 years of age, please read this form and ask any questions you may have before agreeing to allow him or her to be in the study.

Sheila J. Benton, a doctoral candidate in the School of Education at Liberty University, is conducting this study.

Background Information: The purpose of this study is to gain insights into how a student copes with returning to the learning environment after sustaining a concussion. I have chosen to study a student whose symptoms have lasted longer than three weeks to research a recovery period that would potentially provide valuable information on the needs and issues that surround a student as he or she returns to the learning environment.

Procedures: If you agree to allow your child/student to be in this study, I would ask him or her to do the following things:

12. Set up a time for an initial interview to gain his or her perspective of the primary student returning to the classroom. This interview will be audiotaped and transcribed using assigned pseudonyms to keep identities confidential in the reporting of the findings. This procedure should last approximately 20 minutes.
13. Participate in a focus group. The focus groups will be divided into groups based on family, peers, and faculty/staff. Each group will discuss issues and needs that group members have noticed about the case study student. Participants will be asked to share their perspective and respond to other group members' comments. The focus group will be recorded, transcribed with pseudonyms, and then deleted. The focus group discussion should last about 30 minutes.
14. Participate in a review of the transcription of interviews to check for accuracy. This step should only take about 15 minutes.

Risks and Benefits of being in the Study: The risks involved in this study are minimal, no more than you would encounter in everyday life. However, please note that if I am privy to information that triggers the mandatory reporting requirements for child abuse, child neglect, elder abuse, or intent to harm self or others, it will be reported. In these types of research, this must be disclosed as a risk to participants.

There are no direct benefits to participants.

The benefits to society include giving a voice to students who have suffered a concussion and are returning to the classroom, along with an in-depth description of the issues that may present themselves in this situation. This study aims to share the effects of a concussion beyond a simple list of symptoms, bringing a better understanding of the students themselves, to better understand how they cope when returning to the learning environment.

Compensation: Your child/student will be compensated for participating in this study with a $10 gift card at the end of the study once interviews and focus groups have concluded. If your child does not complete the items above, he or she will not receive any compensation as another student would need to be chosen.

Confidentiality: The records of this study will be kept private. In any sort of report, I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records. I may share the data I collect from your child for use in future research studies or with other researchers; if I share the data that I collect about your child, I will remove any information that could identify him or her, if applicable, before I share the data.

- Interviews will be conducted in an office or conference room at the high school or at the public library. The room will have a window where others may see in but cannot overhear the interview.
- Each participant will be assigned a pseudonym to protect his or her identity. As all interviews are being transcribed, any use of a real name will be substituted with an assigned pseudonym.
- All electronic data will be stored on a password-protected computer and password protected external hard drive as a backup. All paper copies will be kept in a secure, locked safe with a combination only know by the researcher. Once an electronic copy has been secured (i.e., transcription or scanning) the hard copies will be permanently destroyed through incineration. After three years, all electronic records will be deleted.
- Digital recordings will be transcribed to a digital Word file. The transcription will be conducted by myself as the researcher or by a professional, legal transcriptionist, who has signed a privacy and confidentiality agreement. These recordings will be deleted from the digital device used to record.
- Limits of Confidentiality: Due to the use of focus groups with other participants identified, I cannot assure participants that other members of the focus group will not share what was discussed with persons outside of the group.

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether or not to allow your child/student to participate will not affect his or her current or future relations with Liberty University or the selected school in this study. If you decide to allow your child/student to participate, he or she is free not to answer any question or withdraw at any time without affecting those relationships.

How to Withdraw from the Study: If your child/student chooses to withdraw from the study, you or your child/student should contact the researcher at the email address/phone number

included in the next paragraph. Should your child/student choose to withdraw, data collected from him or her, apart from focus group data, will be destroyed immediately and will not be included in this study. Focus group data will not be destroyed, but his or her contributions to the focus group will not be included in the study if he or she chooses to withdraw.

Contacts and Questions: The researcher conducting this study is Sheila J. Benton. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at [redacted] or [redacted]. You may also contact the researcher's faculty advisor, Dr. Brian Yates at [redacted].

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, **you are encouraged** to contact the Institutional Review Board, 1971 University Blvd, Green Hall 1887, Lynchburg, VA 24515 or email at irb@liberty.edu.

Please notify the researcher if you would like a copy of this information to keep for your records.

Statement of Consent: I have read and understood the above information. I have asked questions and have received answers. I consent to allow my child/student to participate in the study.

(NOTE: DO NOT AGREE TO ALLOW YOUR CHILD/STUDENT TO PARTICIPATE UNLESS IRB APPROVAL INFORMATION WITH CURRENT DATES HAS BEEN ADDED TO THIS DOCUMENT.)

☐ The researcher has my permission to audio record my child/student as part of his or her participation in this study.

_____

Signature of Minor Date

_____

Signature of Parent Date

_____

Signature of Investigator Date

Informed Consent – School Faculty/Staff, Parent(s), and Sibling(s) and Peers 18 and Older

CONSENT FORM

Return to Learn: Understanding Concussions in the Classroom
Sheila J. Benton
Liberty University
School of Education

You are invited to be in a research study of understanding what it is like to return to the classroom with a concussion. You were selected as a possible participant because you were identified as being a parent of a non-minor primary participant this case study is based on or you are identified as a sibling, peer, or faculty/staff member of the primary student this case study is based on. If you are 18 years of age or older, please read this form and ask any questions you may have before agreeing to be in the study.

Sheila J. Benton, a doctoral candidate in the School of Education at Liberty University, is conducting this study.

Background Information: The purpose of this study is to gain insights into what it is like for a student to return to the learning environment after sustaining a concussion. I have chosen to study a student whose symptoms have lasted longer than three weeks to research a recovery period that would potentially provide information on the needs and issues that surround a student as he or she returns to the learning environment

Procedures: If you agree to be in this study, I would ask you to do the following things:

4. Set up a time for an initial interview to gain your perspective on the primary student returning to the classroom. This interview will be audiotaped and transcribed using assigned pseudonyms to keep identities confidential in the reporting of the findings. This procedure should last approximately 20 minutes.
5. Participate in a focus group divided into groups based on family, peers, and faculty/staff. Each group will discuss issues and needs that group members have noticed about the case study student. Participants will be asked to share their perspective and respond to other group members' comments. The focus group will be recorded, transcribed with pseudonyms, and then deleted. The focus group discussion should last about 30 minutes.
6. Participate in a review of the transcription of interviews to check for accuracy. This step should only take about 15 minutes.

Risks and Benefits of being in the Study: The risks involved in this study are minimal, no more than you would encounter in everyday life. However, please note that if I am privy to information that triggers the mandatory reporting requirements for child abuse, child neglect, elder abuse, or intent to harm self or others, it will be reported. In these types of research, this must be disclosed as a risk to participants.

There are no direct benefits to participants.

The benefits to society include giving a voice to students who have suffered a concussion and are returning to the classroom along with an in-depth description of the issues that may present themselves in this situation. This study aims to share the effects of a concussion beyond a simple list of symptoms, bringing a better understanding from the student him or herself to better understand how he or she copes when returning to the learning environment.

Compensation: You will be compensated for participating in this study with a $10 gift card at the end of the study once interviews and focus groups have concluded. If you do not complete the items above, you will not receive any compensation as another participant would need to be chosen for the study.

Confidentiality: The records of this study will be kept private. In any sort of report, I might publish, I will not include any information that will make it possible to identify a subject. Research records will be stored securely, and only the researcher will have access to the records. I may share the data I collect from you for use in future research studies or with other researchers; if I share that data that I collect about you, I will remove any information that could identify you, if applicable, before I share the data.

- Interviews will be conducted in an office or conference room at the high school or at the public library. The room will have a window where others may see in but cannot overhear the interview.
- Each participant will be assigned a pseudonym to protect his or her identity. Only the participant and I will know the assigned name. As all interviews are being transcribed, any use of a real name will be substituted with an assigned pseudonym.
- All electronic data will be stored on a password-protected computer and password protected flash drive as a backup. All paper copies will be kept in a secure, locked safe with a combination only know by the researcher. Once an electronic copy has been secured (i.e., transcription or scanning), the hard copies will be permanently destroyed through incineration. After three years, all electronic records will be deleted.
- Digital recordings will be transcribed to a digital file. The transcription will be conducted by myself as the researcher or by a professional transcriptionist who has signed a privacy and confidentiality agreement. These recordings will be deleted from the digital device used to record.
- Limits of Confidentiality: Due to the use of focus groups with other participants identified, I cannot assure participants that other members of the focus group will not share what was discussed with persons outside of the group. However, it will be asked for all to do so.

Voluntary Nature of the Study: Participation in this study is voluntary. Your decision whether or not to participate will not affect your current or future relations with Liberty University or the selected school in this study. If you decide to participate, you are free to not answer any question or withdraw at any time without affecting those relationships.

How to Withdraw from the Study: If you choose to withdraw from the study, please contact the researcher at the email address/phone number included in the next paragraph. Should you

choose to withdraw, data collected from you, apart from focus group data, will be destroyed immediately and will not be included in this study. Focus group data will not be destroyed, but your contributions to the focus group will not be included in the study if you choose to withdraw.

Contacts and Questions: The researcher conducting this study is Sheila J. Benton. You may ask any questions you have now. If you have questions later, **you are encouraged** to contact her at [redacted] or [redacted]. You may also contact the researcher's faculty advisor, Dr. Brian Yates at [redacted].

If you have any questions or concerns regarding this study and would like to talk to someone other than the researcher, you are encouraged to contact the Institutional Review Board, 1971 University Blvd, Green Hall 1887, Lynchburg, VA 24515 or email at irb@liberty.edu.

Please notify the researcher if you would like a copy of this information for your records.

Statement of Consent: I have read and understood the above information. I have asked questions and have received answers. I consent to participate in the study.

(NOTE: DO NOT AGREE TO PARTICIPATE UNLESS IRB APPROVAL INFORMATION WITH CURRENT DATES HAS BEEN ADDED TO THIS DOCUMENT.)

☐ The researcher has my permission to audio-record me as part of my participation in this study.

_____

Signature of Participant Date

_____

Signature of Investigator Date

APPENDIX E: Potential Questions

Potential Interview Questions – Primary Participant:

1. Icebreaker: What are your favorite activities at school?
2. Could you share how and when you received your concussion?
3. Describe what was it like to return to school after suffering a concussion?
4. How did your friends and classmates react to you when you returned?
5. What types of physical symptoms did you experience at first? What about now?
6. Describe how these symptoms affected you academically and in the classroom?
7. Did your participation in class change? Why do you think that is the case?
8. What activities do you like to do with your friends socially?
9. How has the concussion changed your social life?
10. How has the concussion affected your interactions with others?
11. What do you think is the most significant difference in your learning when you compare yourself before and after the concussion?
12. Is there anything related to your experience that you feel is important to share? It could be a major concern or something small that you would like to share.
13. If needed, may I contact you by e-mail, phone, or otherwise to follow up on any questions that may arise?

Potential Interview Questions – Secondary Participant – Individual Parent:

1. Icebreaker: Can you tell me a little bit about _____ .
2. Can you tell me about the circumstances surrounding the incident that caused the concussion?
3. Please tell me a little bit about the school that _____ attends.
4. What subjects is your child taking right now in school? What level of coursework, college prep., honors, or advanced placement?
5. Please describe any challenges that you have seen your child face at school since suffering his/her concussion.
6. What has your child done to overcome these challenges in the school setting and at home when completing school assignments?
7. Can you please describe any changes that have occurred in how your child interacts with friends or classmates since the concussion?
8. Could you share any emotional changes that have occurred since the concussion?
9. Is there anything related to this study that you feel is important to share? It could be a major concern or something small that you would like to share.
10. If needed, may I contact you by e-mail, phone, or otherwise to follow up on any questions that may arise?

Potential Interview Questions – Secondary Participant – Sibling(s):

*Depending on the age of the siblings, individual interviews may not be conducted, and questions would be included with the family focus group with parents present.

1. Icebreaker: Can you describe _____
2. What do you know about the concussion or bump on the head that _____ received [weeks/months] ago?
3. Please describe anything different that you have noticed since the concussion or bump on his or her head.
4. What changes have you noticed with _____ working on his or her school work.
5. Is there anything related to this study that you feel is important to share? It could be a major concern or something small that you would like to share.
6. If needed, may I contact you to follow up on any questions that may arise?

Potential Focus Group Questions – Secondary Participant – Parent(s) and Sibling(s):

1. It has been some time since we met. What changes have you noticed about _____ as it relates to his/her school work?
2. Have you noticed any changes with how _____ completes school assignments now?
3. What differences have you seen with _____ and how he or she interacts with their friends?
4. Is there any other information that you would like to add to this study?
5. If needed, may I contact you by e-mail, phone, or otherwise to follow up on any questions that may arise?

Potential Interview Questions – Secondary Participant – Friends/Classmates:

1. Icebreaker: What are your favorite activities at school?
2. Would you be willing to share how you found out about _____ concussion?
3. Describe _____ when he or she returned to school.
4. Describe any changes in his or her participation in class?
5. Does anything unusual stand out in your mind about _____ interactions in or out of the classroom?
6. Can you describe _____ social activities?
7. How have they changed since the concussion?
8. Has _____ interactions with teachers changed? In what ways?
9. What about their interactions with other classmates? Any changes there and in what ways?
10. Is there anything related to this study that you feel is important to share? It could be a major concern or something small that you would like to share.
11. If needed, may I contact you by e-mail, phone, or otherwise to follow up on any questions that may arise?

Potential Focus Group Questions – Secondary Participants – Friends/Classmates

1. Time has passed since we met individually. What can you share about any symptoms you may have noticed since then?
2. What can you share about _____ participation in class before the concussion as compared to how he or she participates now?
3. What can you share about any differences socially or in how they interact with others?
4. Is there anything related to this study that you would like to add?
5. If needed, may I contact you by email, phone, or other to follow up on any questions that may arise?

Potential Questions – Secondary Participant – Faculty/Staff:

1. Icebreaker: What is your position at the school? How do you know _____?
2. When did you learn about _____ receiving a concussion?
3. How were you informed about the concussion?
4. Describe any physical symptoms that you noticed from _____ after the concussion? What about now?
5. How did these physical symptoms affect _____ academically?
6. Have you noticed a difference in _____ participation in class? Can you describe similarities and differences before and after the concussion?
7. What concerns did _____ share with you concerning his/her progress in the classroom before or after the concussion.
8. What have you noticed about _____ ‘s interactions with others being affected by the concussion?
9. What activities are you aware of that _____ is involved with outside of the classroom? Have you been made aware of any changes in these activities?
10. Is there anything related to this study that you feel is important to share? It could be a significant concern or something small that you would like to share.
11. If needed, may I contact you by email, phone, or otherwise to follow up on any questions that may arise?

Potential Focus Group Questions – Secondary Participants – Teachers

1. Time has passed since we met for individual interviews. What can you share about any symptoms you may have noticed since then?
2. Please share about _____ recent participation in class.
3. How has _____ academic performance been affected?
4. Please share what you have observed concerning _____ interactions with others in the classroom recently.
5. Is there anything related to this study that you would like to add?
6. If you would like to share something individually, I will be happy to meet with you for a few minutes following this focus group.

12. If needed, may I contact you by email, phone, or other to follow up on any questions that may arise?

APPENDIX F: Authorization of Release

Authorization of Release of Educational-Related Information

By executing the Authorization, I authorize the high school of attendance to disclose information and documentation concerning the student listed below as deemed necessary for a research study being conducted. Information will include interviews with faculty and staff, along with paper documentation directly pertaining to this study. This information will be released to Sheila J. Benton. This information may only be used for research being conducted by Sheila J. Benton. I understand that when this information is disclosed pursuant to the Authorization, that it may be re-disclosed and may no longer be protected by federal privacy laws. This Authorization will expire 1 year from the date that this Authorization is signed.

_____ _____

Signature of Individual Whose Information is to be disclosed Date

_____ _____

Signature of Parent or Guardian of Individual Date

_____ _____

Printed Name of Individual (Student) Printed Name of Parent or Guardian

Documentation to be requested:

- Confirmation of no prior academic accommodations:

  _____(School Official)
- Documentation showing current accommodations made in the academic setting for the above student.
  - *If no formal accommodations exist, teachers will be asked to construct a list of interventions, accommodations, or adjustments made in the classroom.
- Documentation of grades and attendance for one year prior to injury until most recent grades will be requested at the conclusion of field research.
- Documentation of visits to nurse's office following the concussion including times, duration, complaints, and outcomes of the visit.
- Documentation from guidance, such as homebound documentation, ect.
- Any documentation that the athletic director, coach or athletic trainer may have concerning the student and the injury.
- Any communication from anyone at the school concerning the effects of the concussion on the student.

*** All documentation will be coded with pseudonyms upon receipt of the researcher, identifying information blacked out, converted to digital files, and hard copies destroyed.

APPENDIX G: Code Sheet

Code Sheet - Pseudonyms

Position in the Study	Letters	Female Pseudonym	Male Pseudonym	
Primary Participant	A - C	Abigail Barbara Cynthia	Andrew Brian Carl	
Secondary Participant	D – J	Emma Fran Gail Hanna Isabelle Jacqueline	Earl Frank Gary Henry Ian Jack	
Siblings	K-M	Karen Lucy Mary	Kevin Larry Matt	
Teachers (Mr. or Ms.)	A-L	Anderson Bryant Campbell Davis Effingham Frank	Garcia Harris Ingles Johnson Kent Lane	
Coaches (Coach)	M-P	Murray Newton	O'Day Patterson	
AT (Coach)	Q-R	Quince	Randall	
Nurse (Nurse)	S- T	Stuart	Taylor	
Guidance (Mr. or Ms.)	U-V	Underwood	Vasquez	
Administration (Mr. or Ms.)	W-Z	Wood Xavier	Young Watkins	
Parents		Mom	Dad	
Location	ABC High School			
District	Somewhere School District			

APPENDIX H: Recommendation of Secondary Participants

[Primary Participant Name],

Thank you for taking a few minutes to meet and discuss potential participants for your study. There are three categories that these participants would fall into; friends and classmates; teachers; and family. Please provide potential names of people who you think would be willing to participate and who would have knowledge your return to the classroom.

Friends and Classmates (Letters of recruitment will be sent to these students and their parents)

Name	Address (If known) OR Homeroom Class

Teachers; coach; athletic director; athletic trainer; nurse; guidance personnel; principal; assistant principal; or any other adult at the school who you were around at the time of your concussion.

Name/ Position	

Should arise that more names are needed, I will be in contact with you. Again, thank you for your time to create this list of potential participants.

APPENDIX I: Journaling Prompt

Journaling Prompt for Primary Participant

The following will be attached to the inside cover of a composition book to guide the primary participant during the three-week period of journaling. At the initial interview the journal composition notebook will be given to and reviewed with the primary participant. Any questions can be answered at that time.

Please use this notebook for journaling for the next three weeks. Please include any thoughts that you have on how you are dealing with the return to classes after sustaining a concussion. You may include any that you think of that is related to school, academics, social life, and your personal feelings toward what is happening during this time.

Things to remember:

- Each day, please go to the next clean page and put the date at the top of the page.
- Any name used in this journal will be given a pseudonym when it is transcribed into a digital file.
- If you do not have your journal with you and think of something to include, please write it down on regular paper and tape it into the notebook on the appropriate day.
- This notebook is for your input only.
- I will personally transcribe this data and keep the original copy in a secure location until it is time to destroy it.