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The Academic and Behavioral Impact of
Multiple Sport Participation on
High School Athletes

by

Christopher James Kohl

October, 2017

A Dissertation submitted to the Education Faculty of Lindenwood University in

partial fulfillment of the requirements for the degree of

Doctor of Education

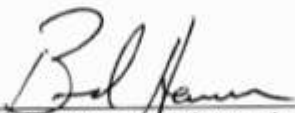
School of Education

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Lindenwood University, School of Education




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Declaration of Originality

I do hereby declare and attest to the fact that this is an original study based solely upon my own scholarly work at Lindenwood University and that I have not submitted it for any other college or university course or degree.

Full Legal Name: Christopher James Kohl

Signature: Christopher James Kohl Date: October 14, 2017

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Abstract

For many high school student athletes, there is increased pressure to specialize in one sport, to participate at a high level, and to play year-round (Brenner, 2016). This increased emphasis on sport specialization has led to a proliferation of overuse injuries, overtraining, and burnout (Brenner, 2016). Sport specialization significantly contributes to overuse injuries, which account for almost half of all sport injuries (Andrews & Yaeger, 2013). This research was designed to clarify if there are significant differences in the behavioral and academic performance of student athletes who compete in one sport and student athletes who compete in multiple sports. Six high schools in southwest Missouri provided GPAs, hours absent, and days suspended for approximately 1,500 student athletes for the 2015-2016 school year. An ANOVA test was conducted to determine if significant differences existed among one-, two-, and three-or-more sport athletes for each individual area of study. When single-sport athletes were compared to multiple-sport athletes, significant differences were discovered in each area of study including GPAs, hours absent, and days suspended. In all instances of significant difference, multiple-sport athletes demonstrated improved academic and behavioral performance over single-sport athletes. These findings should assist students, coaches, parents, teachers, and administrators in decision-making about student athletics participation.

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Chapter One: Introduction

During the 2015-2016 school year in Missouri, 590 high schools offered extracurricular activities in the form of athletics (Missouri State High School Activities Association [MSHSAA], 2016). In the same school year, 161,628 students participated in Missouri State High School Activities Association (MSHSAA)-sponsored athletics (MSHSAA, 2016). These 161,628 student athletes accounted for 240,339 participation records, indicating some students competed in one sport, some in two sports, and some in three or more sports during the noted calendar year (MSHSAA, 2016).

Mark Rerick (2016) of the National Federation of State High School Associations (NFHS) contended one of the most controversial debates in today's youth sports scene is whether athletes should specialize in a single sport or try their hands at participation in multiple sports. Dr. Joel Brenner (2016) stated:

There is increased pressure to participate at a high level, to specialize in 1 sport early, and to play year-round, often on multiple teams. This increased emphasis on sports specialization has led to an increase in overuse injuries, overtraining, and burnout. (para. 2)

As Dr. Brenner (2016) and Mark Rerick (2016) have pointed out, the impact of sport specialization has become a top priority for today's youth athletes.

Background of the Study

Sport specialization in young athletes has been a common occurrence in several sports for many decades (Smith, 2015). This practice has been commonly implemented in individual sports, in many cases resulting in Olympic competition or professional circuit participation (Smith, 2015). Prettyman and Lampman (2011) noted, "In the

1970's people began to discover highly talented, medal winning Olympic athletes from the communist nations of the Soviet Union and East Germany had specialized in their sports from a young age" (p. 8). By the early 1990s, young athletes in the United States were encouraged to specialize in a single sport through the year so they could develop elite skills and move to higher levels of competition where the rewards are greater. Currently, this trend continues as athletes choose to specialize in one sport, seeking elite status in the sport of choice (Wojtys, 2013).

One of the major problems associated with sport specialization is overuse injury (Andrews & Yaeger, 2013). With the number of students who are choosing sport specialization, it is no surprise overuse injuries are common (DiFiori et al., 2014). Jayanthi, Labella, Fischer, Pasulka, and Dugas (2015) stated, "The risk of injury, overuse injury, and serious overuse injury increases as the degree of specialization increases" (p. 801). These injuries may be both physical and psychological (Brenner, 2016).

In addition to attention from medical organizations, sport specialization has recently been addressed by coaches and athletes (Hyman, 2009). Tommy John, the pitcher whose name is associated with a famous elbow surgery, stated he could give 30 lessons a week to eight through 12-year old's but refuses to do it due to the potential for injury and burnout (Hyman, 2009). Sport specialization can increase risk for burnout and early departure from sports (White & Oatman, 2009). Symptoms for burnout include fatigue, depression, irritability, and weight loss (DiFiori et al., 2014). Burnout can be prevented by encouraging young athletes to become well-rounded and to participate in multiple activities (Brenner, 2007).

To support the practice of sport specialization on a year-round basis, parents are required to make financial sacrifices (Hyman, 2012). Prettyman and Lampman (2011) contended, “Many parents don’t realize that the current emphasis on early specialization in youth sports is due in great part to the privatization and professionalization of youth sports” (p. 6). Parents can easily spend over \$2,000 annually on their child’s sport participation with the elite levels of participation costing over \$20,000 annually (Project Play, 2015a).

By all measures, there is an increase in the number of high school student-athletes competing in non-school club sports programs across the country (Haddix, 2015). Young athletes are increasingly involved in club teams to experience high-intensity training to foster the development of the one-sport skillset (Cheatham & Little, 2015). Because of the access to and influence of club sports, more high school athletes are choosing to specialize at an earlier age (Rerick, 2016).

There has been an increase in pressure to participate in one sport (Brenner, 2016). Oftentimes the pressure to specialize comes from an adult, either a coach or a parent (Rerick, 2016). Parental logic has become the more money and time invested, the better-skilled their child will be, thus resulting in future benefits such as scholarships and recognition (Stewart & Shroyer, 2015).

When discussing how many sports, on average, children participate in, Project Play (2016) noted:

The average kid between the ages of 6 and 17 played less than two team sports (1.89). The downward slide continued even though the evidence base grew that

specializing in one sport is harmful to the body, and playing multiple sports is protective. (p. 9)

If parents and athletes are truly seeking success in the athletic world, the Project Play (2016) findings should be directly compared with those of the United States Olympic Committee (USOC), who showed Olympic Athletes were involved in an average of three sports until the age of 14 and then an average of 2.2 sports from the ages of 15-18 (United States Olympic Committee [USOC], 2014). Further, this USOC report confirmed the findings of Post et al. (2016), who stated sport specialization increases as student athletes get older.

Cheatham and Little (2015) argued, “Participation in multiple sports into adolescence may enhance a young athlete’s chance of attaining elite status in one particular sport” (p. 725). Data reinforcing this point revealed from 2013 to 2016, first-round draft picks in the National Football League were over two times more likely to play three sports in high school than to have specialized in football only (Spilbeler, 2016). Participation in multiple sports allows athletes to become more athletically diverse and adaptable (Balyi, Way, & Higgs, 2013).

To advocate for the multi-sport experience, over 40 national and international sports organizations have joined a movement called “Project Play” (Michigan High School Athletic Association, 2016). Additionally, several medical organizations have released position statements that, although slightly different, do not support sport specialization (Ferguson & Stern, 2014). These medical organizations include the American Academy for Pediatrics, the World Health Organization, and the International Federation of Sports Medicine (Ferguson & Stern, 2014).

Conceptual Framework

There are many experts in the area of sports science; however, two in particular stand out for their experience in this topic area and therefore guided this research. The first is Dr. Joel S. Brenner. Dr. Brenner is the medical director of Children's Hospital of the King's Daughters (CHKD) sports medicine and adolescent medicine programs and the director of CHKD's sports concussion program (Children's Hospital of the King's Daughters [CHKD], 2014). Dr. Brenner lectures locally, nationally, and internationally on topics including concussions and over-training in young athletes (CHKD, 2014). Notable research topics investigated by Dr. Brenner include overuse and over-scheduling in youth sports, concussions in youth sports, and sports medicine education in pediatric residents (CHKD, 2014). Dr. Brenner has educated adults, children, and medical experts on the dangers of overuse in student athletes that can result from sport specialization (CHKD, 2014).

Dr. Brenner expressed the belief medical advice should be sought when considering sport specialization (Brenner, 2016). According to Brenner (2016), there is an appropriate time for an athlete to specialize in a single sport, and currently in youth sports, specialization is taking place too soon in the physical development of youth. This premature specialization is having a noticeable impact on children, both physically and mentally (Brenner, 2016). Because of Dr. Brenner's work in the medical field and his passion for protecting young athletes, his was one of two philosophies applied to this research (CHKD, 2014).

The second philosophy guiding this research was the work of Dr. James R. Andrews. Dr. James R. Andrews is internationally known and recognized for his skill as

an orthopedic surgeon and for his scientific and clinical research contributions in knee, shoulder, and elbow injury prevention treatment (Andrews Institute, 2017). He recently published the book *Any Given Monday*, which was written for athletes, parents, and coaches concerning sports injuries and how to prevent those injuries (Andrews & Yaeger, 2013). Dr. Andrews is one of the founding members of Andrews Sports Medicine and Orthopedic Clinic (Andrews Institute, 2017). He has prescribed a protective approach to participation, as Andrews and Yaeger (2013) outlined:

It is our responsibility to protect our kids. Let's speak up for them, cheer them on, and make the kinds of choices in our own lives that will empower them to make good choices too. It's about preserving the future for each kid, whether he or she will go on to become a professional athlete, a college star, or just a healthy adult well equipped to enjoy a happy fulfilling life. (p. 41)

Dr. Andrews espoused a sound approach to sports medicine, an approach based in research (Andrews & Yaeger, 2013).

With Dr. Brenner and Dr. Andrews providing medical reasoning for multiple sport participation and cautioning against sport specialization, this research was intended to support their message through the academic arena. By reviewing the academic and behavioral performance of student athletes, the researcher hoped to provide information to support the causes of both Dr. Brenner and Dr. Andrews.

Statement of the Problem

One of the greatest causes of injury in student athletes is sport specialization (Andrews & Yaeger, 2013). Almost half of all sports injuries are related to overuse (Andrews & Yaeger, 2013). Recently, pressure has been increased to participate at high

levels, to specialize in one sport early, and to play year-round, often on multiple teams in one sport (Brenner, 2016). This increased emphasis on sport specialization has led to an increase in overuse injuries, overtraining, and burnout (Brenner, 2016).

Currently there is a great deal of information about sport specialization and the potential dangers of the practice—burnout and injury to name two (Brenner, 2016). There is very little research designed to determine academic and behavioral differences (if any) between multiple-sport athletes and single-sport athletes. This investigator sought to clarify if there is a significant difference in grade point averages (academics), days suspended (behavior), and hours absent (behavior) between high school athletes who compete in one sport and high school athletes who compete in multiple sports.

To highlight the increased presence of concerns about health risks to young people who specialize too early and narrowly on a single sport, the Michigan High School Athletic Association (2016) created a task force to work throughout 2016 on promoting the benefits of multi-sport participation. In addition to efforts like those of the Michigan High School Athletic Association, many other national organizations have begun to preach about the concerns of sport specialization including the American Academy of Pediatrics, the National Athletic Trainers Association, and the American Medical Society for Sports Medicine (Ferguson & Stern, 2014).

Purpose of the Study

There are many benefits for students who participate in co-curricular activities, which are inherently educational and support the academic mission of schools (Shomper, 2011). Activities teach students lessons that lead to being better citizens, and they foster success for students later in life (Shomper, 2011). Students who participate in school

activities make higher grades and have better attendance than average students (Shomper, 2011). Students who participate in sports are also more likely to attend college (Martin, 2015). Despite the tremendous benefits of participating in sports, many students drop out of sports each year (Shomper, 2011). Reasons include no longer being interested in sports, no longer having fun, problems with coaches, financial concerns, wanting to do something different, and sport specialization (Shomper, 2011).

The purpose of this project was to clarify if there is a significant difference in academic and behavioral performance between students who participate in one sport and students who participate in multiple sports. Grade Point Average (GPA) was used to determine academic performance, while hours absent and days suspended were used to determine behavioral performance. One of the biggest topics currently in today's youth sports culture is whether high school athletes should play multiple sports or specialize in one sport (Rerick, 2016). This investigator sought to clarify if there is an academic and/or behavioral difference between high school athletes who participate in one sport and high school athletes who participate in multiple sports.

Research questions and hypotheses. The following research questions and hypotheses guided the study:

1. What is the difference, if any, in annual non-weighted GPA for high school athletes who compete in one sport and high school athletes who compete in multiple sports?

H₁₀: There is no difference in annual non-weighted GPA for high school athletes who compete in one sport and high school athletes who compete in multiple sports.

H1_a: There is a statistically significant difference in annual non-weighted GPA for high school athletes who compete in one sport and high school athletes who compete in multiple sports.

2. What is the difference, if any, in annual hours absent for high school athletes who compete in one sport and high school athletes who compete in multiple sports?

H2₀: There is no difference in annual hours absent for high school athletes who compete in one sport and high school athletes who compete in multiple sports.

H2_a: There is a statistically significant difference in annual hours absent for high school athletes who compete in one sport and high school athletes who compete in multiple sports.

3. What is the difference, if any, in annual days suspended for high school athletes who compete in one sport and high school athletes who compete in multiple sports?

H3₀: There is no difference in annual days suspended for high school athletes who compete in one sport and high school athletes who compete in multiple sports.

H3_a: There is a statistically significant difference in annual days suspended for high school athletes who compete in one sport and high school athletes who compete in multiple sports.

Definition of Key Terms

The following key terms are defined:

Missouri State High School Activities Association (MSHSAA). The MSHSAA (2016) is responsible for the formulation of standards to guide interscholastic activities in Missouri.

Sport specialization. Sport specialization is intense training in one sport while excluding other sports (Jayanthi, Pinkham, Dugas, Patrick, & Labella, 2013).

Limitations and Assumptions

The following limitations and assumptions were identified in this study:

1. The sample population and demographics in this research were a limitation, as data were restricted to high schools in southwest Missouri.
2. Schools included in this study did not have the exact same extracurricular athletics offered. This means students could have the opportunity to participate in some sports at one school that students at a different high school would not. In this study, the following athletics were not offered at all six high schools: Football, Softball, Tennis, Swimming and Diving, Soccer, and Golf.
3. This research included an assumption of specialization. This research involved the investigation of athletes who participated in one or more sports. It is important to note not all athletes who participate in one sport specialize in that one sport. There are many reasons a student may only be on one roster, including finances, time, or physical constraints. Data on statistical differences in GPAs, days absent, and/or days suspended between single-sport and multi-sport athletes should be made available for those considering specializing to help guide their decisions about sport participation in high school.

4. There was an assumption all participating school districts in this research kept accurate records for student attendance and discipline.

Summary

One of the biggest debates in today's youth sports culture is whether high school athletes should specialize in one sport or play multiple sports (Rerick, 2016). Currently, there is an increased emphasis on sport specialization leading to an increase in overuse injuries, overtraining, and burnout (Brenner, 2016). This investigator sought to clarify if there is a significant academic and/or behavioral difference between high school athletes who participate in one sport and high school athletes who participate in multiple sports.

In Chapter Two, current literature is reviewed to explore various aspects of sport specialization. Topics including history, injury, and costs associated with sport specialization are reviewed. The practice of sport specialization is receiving substantial attention from multiple national and international health associations (Ferguson & Stern, 2014) and will be a pressing issue for many student athletes in the coming years (Michigan High School Athletic Association, 2016).

Chapter Two: Review of Literature

Sport specialization is becoming the norm in youth sports for a variety of reasons (Brenner, 2016). When sport specialization occurs too early, detrimental effects may occur, both physically and psychologically (Brenner, 2016). There are many benefits for students who participate in co-curricular activities, which are inherently educational and support the academic mission of schools (Shomper, 2011). Despite the many benefits of participating in sports, practices such as sport specialization force students to drop out of sports each year (Shomper, 2011).

The purpose of this project was to clarify if there is a significant difference in academic and behavioral performance between students who participate in one sport and students who participate in multiple sports. Grade point average was used to determine academic performance, while hours of absence and days of suspension indicated student behavioral performance. One of the biggest debates pushed in today's youth sports culture is whether high school athletes should specialize in one sport or play multiple sports (Rerick, 2016). This investigator sought to clarify if there is an academic and/or behavioral difference between high school athletes who participate in one sport and high school athletes who participate in multiple sports.

In this chapter, key topics centered on sport specialization and high school athletes are reviewed. Topics covered in this chapter include a brief history of sport specialization, the potential for injury, burnout, costs, club sports, pressures to specialize, the prevalence of specialization, benefits of multiple sport participation, organizational efforts regarding specialization, and perceptions of athletes and coaches regarding sport specialization.

Conceptual Framework

In recent years the idea of focusing on one sport has gained popularity as a practice for young athletes involved in not only individual sports, but also team sports (Smith, 2015). This practice has made it less common to have a multi-sport athlete in middle or high school because the norm has become for young athletes to specialize in a single sport at younger ages (Brenner, 2016). Unfortunately, the practice of sport specialization is having a major impact on our student athletes including the epidemic of overuse injuries (Andrews & Yaeger, 2013).

To help guide this research the expertise of two notable sports medicine physicians was applied. First, Dr. Joel Brenner, Medical Director of Children's Hospital of the King's Daughters, has published several recommendations regarding the practice of sport specialization (CHKD, 2014). Most recently, Dr. Brenner has expressed the concern for the increase in pressure to specialize in one sport early and that this increased emphasis on sport specialization has led to an increase in overuse injuries and burnout (Brenner, 2016). It is the recommendation of Dr. Brenner (2007) athletes should be encouraged to become well rounded and well versed in a variety of activities rather than one particular sport.

The second expert in sports medicine and overuse injuries used to guide this research was the work of Dr. James Andrews. Dr. James Andrews is one of the founding members of Andrews Sports Medicine and Orthopedic Center and has affiliations with multiple sports organizations including Washington Redskin and Alabama Crimson Tide football (Andrews Institute, 2017). Dr. Andrews (2013) has noted that one factor that contributes significantly to the rate of overuse injury is sport specialization. It is the

observation of Dr. Andrews that athletics is one of the leading health risks for children and nearly 50 percent of all sports injuries are related to overuse.

By using the concerns and recommendations of Dr. Brenner and Dr. Andrews regarding sport specialization, this literature was guided with a strong medical recommendation regarding the practice. The purpose for this research was to determine if there were other variables such as academic and behavioral performance in the school environment that could support the message being publicized by these two authorities in sports medicine. As noted by these authors, there are serious concerns with the practice of sport specialization. The sections that follow below in the remainder of chapter 2 provide further insights into the practice of sport specialization and student athletes.

History of Specialization

Sport specialization in young athletes has been a common occurrence in several sports for many decades (Smith, 2015). This practice has been commonly implemented in individual sports, in many cases resulting in Olympic competition or professional circuit participation (Smith, 2015). In their 2011 book entitled *Learning Culture Through Sports*, Prettyman and Lampman (2011) noted in the 1970s people discovered highly talented, medal-winning Olympic athletes from the communist nations of the Soviet Union and East Germany had specialized in their sports from a young age. Prettyman and Lampman (2011) continued by clarifying in the early 1990s, young athletes in the United States were encouraged in the same ways as their European counterparts to specialize in a single sport through the year so they could develop similar elite skills and move to higher levels of competition where the rewards were greater. Currently, the

specialization trend continues as athletes choose to specialize in one sport in order to reach elite status in their sport of choice (Wojtys, 2013).

Over the past 40 years, there have been great changes in the direction of sports in the United States (Wojtys, 2013). Smith (2015) noted, “Recently, focusing on one sport has gained popularity as a practice for young athletes involved in team sports” (p. 220). O’Sullivan (2014) agreed with this viewpoint by noting the greatest difference between children’s sporting experience and that of adults is the rise of year-round, sport-specific organizations that ask—and even require—season after season of participation in order to stay in the player-development pipeline. O’Sullivan (2014) contended, “The pressure to have your child specialize in a single sport at a young age has never been stronger” (para. 1).

Oftentimes the pressure to specialize is driven by parents who operate under the faulty premise early specialization will result in a college scholarship and even eventually lead to a professional sports career (Smith, 2015). Feeley, Agel, and Laprade (2015) asserted over the past 20 years, there has been a shift in emphasis from youth-driven recreational sports activities to parent- and coach-driven skills development with an emphasis on achieving a high level of accomplishment in a single sport. Feeley et al. (2015) continued by noting the causes of this are “multifactorial” and include the increasing emphasis on sports accomplishment in society, financial rewards for elite athletes, and public perception of the value of elite athletic competition.

Smith (2015) concurred with Feeley et al. (2015), “With the increased commercialization of sport at all levels, along with increased media attention and coverage, early sport specialization has become more pervasive in team sports, making

the public more aware of the issue” (p. 222). Given the combination of shifts in attitude, amplified visibility of professional athletes, and reduction in funds for many public schools, the stage has been set for a dramatic change in youth sports (Stewart & Shroyer, 2015). One of those changes is the privatization of sport (Stewart & Shroyer, 2015).

In today’s society, the opportunities to specialize are greater than ever. Wojtys (2013) clarified, “Fifty years ago, opportunities for sports specialization were few and far between” (p. 212). Participating in several sports such as baseball, basketball, football, and track was the goal of many high school athletes (Smith, 2015). Smith (2015) continued:

If you could letter in three, especially before your senior year in high school, that was quite impressive. Those who achieved this goal in their sophomore or yet freshman years were the top of the class. High school sports were the pinnacle for most, with a few going on to college careers. There were no travel teams, and there were limited opportunities outside of high school sports except for summer leagues. Twentieth century American culture celebrated versatility and well roundedness: the three-sport athlete, the quintessential “Renaissance man.” (p. 221)

Prettyman and Lampman (2011) supported the idea of the multi-sport athlete by clarifying how through the mid-1970s, most people believed all-around athletes were the best athletes. For example, young men who played and lettered in three or more varsity sports in high school were given special status in their schools and communities (Prettyman & Lampman, 2011).

Buchberger (2013) extended this notion of well-roundedness with his description the idea of the three-sport athlete was born out of the “big three:” football, basketball, and baseball (p. 2). This formula can take on different combinations in today’s athletically diverse world. Buchberger (2013) noted as the business world has become highly specialized, so has the world of athletics. Athletes now train 12 months of the year for one sport, and teams have players for highly specific situations of a game (Buchberger, 2013). White and Oatman (2009) concurred and pointed out two decades ago, the norm for young athletes was to play a sport in its traditional season. With specialization, children can play about any sport they want year-round (White & Oatman, 2009). Feeley et al. (2015) agreed, “Over the past 15 years, there has been an increase in youth sports participation with a concomitant increase in early year-round training in a single sport” (p. 234).

In his 2016 article “Sports Specialization and Intensive Training in Young Athletes,” Brenner contended:

Youth sports culture has changed dramatically over the past 40 years. It is less common today to see a group of young children congregate in a neighborhood to play a “pick-up” game without any adult influence. The norm has become for children and adolescents to participate in organized sports driven by coaches and parents, often with different goals for the game than its young participants. It is also less common now to have a multisport athlete in middle or high school, because the norm has become for young athletes to specialize in a single sport at younger ages. (p. 1)

VanDeWeghe and DiFiori (2015) continued by noting two ways today's youth sports are very different from a generation ago. First, a greater percentage of athletic time for boys and girls is devoted to structured competitions (VanDeWeghe & DiFiori, 2015). Second, youngsters are frequently pushed to specialize in a single sport (VanDeWeghe & DiFiori, 2015). These changes have come at the expense of children having the chance to play multiple sports, develop sound fundamental skills, and play some sports simply for enjoyment (VanDeWeghe & DiFiori, 2015). Playing only in adult-controlled, formally organized sports and playing in only one sport for most or all of the year has significantly changed the youth sport experience for most children over the past two generations (Prettyman & Lampman, 2011).

Injury

One of the major problems associated with sport specialization is overuse injury (Andrews & Yaeger, 2013). With the number of students who are choosing sport specialization, the injury epidemic is to be expected (DiFiori et al., 2014). Jayanthi et al. (2015) stated, "There is an independent risk of injury and serious overuse injury in young athletes who specialize in a single sport" (p. 794). These injuries may be both physical and psychological (Brenner, 2016).

Mark Rerick (2016) of the National Federation of High School Associations brought to light the increasing injury trend by announcing there is a similarly increasing problem of overuse injuries in high school athletics. It is estimated almost half of all sports-related injuries in student athletes are a result of overuse (Andrews & Yaeger, 2013). It was further noted one of the factors that most significantly contributes to these injuries is specialization (Andrews & Yaeger, 2013). In their 2013 book titled, *Any*

Given Monday, Andrews and Yaeger (2013) stated approximately 45 million children and adolescents are involved in organized athletics in the United States. Nearly three and a half million of them under the age of 14 are treated for sports-related injuries each year, making athletics one of the leading health risks for children (Andrews & Yaeger, 2013). Jayanthi et al. (2015) continued by noting the risk of injury, overuse injury, and serious overuse injury increases as the degree of specialization increases.

The length of time a student athlete spends participating in athletic events is likely a key component in the injury epidemic (DiFiori et al., 2014). DiFiori et al. (2014) explained scheduling issues have recently received more attention as possible factors that increase injury risk in youth athletes. Concern has been raised for year-round training in a single sport and simultaneous involvement in multiple teams in the same sport (DiFiori et al., 2014). Tournament scheduling, where several games are often played in a single day, extending over consecutive days, is also a potential factor (DiFiori et al., 2014).

Myer et al. (2015b) continued by warning children who participate in more hours of sport per week than their age, for more than 16 hours per week in intense training, and who are specialized in sport activities should be closely monitored for indicators of burnout, overuse, injury, or potential decrements in performance due to overtraining. Jayanthi et al. (2015) further clarified young athletes whose number of weekly hours in organized sports exceed their age in years are more likely to have any injury, specifically a serious overuse injury. Bell et al. (2016) provided supporting clarification by asserting participating in a single sport for more than eight months per year appears to be an important factor in the increased injury risk observed in highly specialized athletes.

There are additional implications regarding injuries when investigating sport specialization. Bell et al. (2016) articulated athletes who sustain an injury in a sport and decide to specialize or change sports as a result of these injuries can influence specialization. What is certain, however, is athletes in a high-specialization category are more likely to sustain an overuse injury than athletes who are in a low-specialization category (Bell et al., 2016)

One attribute considered a factor when discussing sport specialization and injury is the notion of free play. Jayanthi et al. (2015) clarified:

Youth sports participation has evolved over the past few decades to include more time participating on organized sports teams and less time devoted to unstructured free play. Our data lend support to the hypothesis that this trend may lead to increased rates of sports-related injuries in young athletes, since those who exceeded a 2:1 ratio of time spent in organized training versus recreational free play were more likely to be injured and develop serious overuse injuries. Unlike structured sports practice, unstructured free play is kid directed rather than adult directed, thus probably explaining its lower injury risk. During free play, when a child gets cold, tired, hungry, bored, or sore, she or he will typically stop; but when being supervised by an adult or when participating in organized competition, the child may feel an expectation to continue and therefore be more likely to push through pain or soreness. Structured sports training and competition do not always allow adequate rest periods for a developing child. (p. 800)

In response to the idea structured activity may increase the rate of injury, adults involved in instruction of youth sports should be vigilant about noting any signs of stress, burnout, or physical symptoms and should be prepared to take corrective action such as backing off training intensity and frequency (Myer et al., 2015a).

In a position statement, the American Medical Society of Sports Medicine's DiFiori et al. (2014) stated the benefits of youth sport are often negated by an overemphasis on competitive success. Young athletes and their parents regularly initiate high-level training at younger ages, which leads to overuse injuries and athletic burnout (DiFiori et al., 2014). Robin Bousquet, a senior physical therapist at the Sports Medicine Center for Young Athletes at Children's Hospital in Oakland, specified, "I see a lot of stress in athletes about practice time and playing time. I see a lot of stress about the pressure to perform. This has all increased 1,000 percent in the last six or seven years" (as cited in Kroichick, 2013, para. 12).

It is important to note some degree of sport specialization is necessary to develop elite-level skills (Jayanthi et al., 2013). However, for most sports, such intense training in a single sport to the exclusion of others should be delayed until late adolescence to optimize success while minimizing injury, psychological stress, and burnout (Jayanthi et al., 2013). In his 2016 published interview, Kevin Lytle quoted Stephen Yemm, a sports medicine specialist at Orthopedic Center of the Rockies and a team physician for Colorado State University for Fort Collins High School, who said he frequently sees overuse injuries in young athletes. Yemm stated he treats many overuse injuries from young people playing the same sport year-round, because athletes who specialize use the same muscle groups over and over and over again (Lytle, 2016). Yemm asserted, "You

continually expose them to the same physical stresses. Over time, the incidence of injury is much higher that if you mix it up” (Lytle, 2016, para. 11).

Michigan High School Athletic Association Executive Director Jack Roberts predicted overuse injuries will be the next major point of discussion with regard to health and safety issues in student athletes (Haddix, 2015). In Missouri, steps are already being taken to address the injury epidemic (MSHSAA, 2016). Todd Zell of the MSHSAA (2016) reported in June of 2017 the NFHS changed Baseball Rule 6-2-6 to state:

Each NFHS member state association will be required to develop its own pitching restriction policy based on the number of pitches thrown during a game to afford pitchers a required rest period between pitching appearances. The need for pitch count restrictions comes from an increase in the number of overuse arm injuries in recent years. Since the purpose of education based athletics is to focus on the intentional development of the educational, social, physical and emotional well-being of each student athlete, developing a restriction to put the health of the student ahead of the result of the game is the right thing to do. (para. 1)

In addition to physical injuries, Cheatham and Little (2015) contended the psychosocial development of a child is also at risk with intense training and sport specialization. The focus on one sport may lead to isolation of the athlete from peers (Cheatham & Little, 2015). The idea is the time commitment to travel teams and weekend tournaments can disengage children or adolescents from attending other recreational or educational activities with their age-matched groups (Cheatham & Little, 2015). Cheatham and Little (2015) argued, “This may slow the critical social development of athletes and promote overdependence of athletes on their sport” (p. 725).

Burnout

Jayanthi et al. (2013) pointed out another potential consequence of early sport specialization is burnout and dropping out of sports. Prettyman and Lampman (2011) agreed by arguing early specialization often leads to high rates of burnout among early developers who are selected to play on select teams with demanding practice and season schedules. The argument is athletes give up before their time because they get exposed to too much too soon (Buchberger, 2013). In their 2014 research, DiFiori et al. argued coaches and parents often lack knowledge about normal development and signs of readiness for certain tasks, both physically and psychosocially. DiFiori et al. (2014) continued by noting, “This can result in unrealistic expectations that cause children and adolescents to feel as if they are not making progress in their sport, especially related to their chronological peers” (p. 10).

One of the causes of burnout is increased pressure in intense, adult-driven specialized training and competitions (Myer et al., 2015a). Myer et al. (2015a) continued, “The psychological risk of burnout, depression, and increased risk of injury may be a reason for withdrawal from sport in young athletes who took part in early specialized training” (p. 440). Mark Rerick (2016) of the NFHS clarified this message:

There are several detriments for kids who specialize. The first is facing a greater risk of burnout. Kids get bored when they have to do the same thing over and over again. Couple that repetition of the same activity with outside pressure placed on the athlete by adults, and it’s a perfect recipe for burnout. Burnout can be caused by many factors, but it ultimately occurs when athletes feel helpless about their ability to meet external (or internal) expectations. (para. 5)

Balyi et al. (2013) noted it is ironic the initial intention of creating an exceptional athlete can result in hindered development and increases the likelihood of that athlete dropping out as a result of anxiety from the extreme pressure to win.

Cheatham and Little (2015) argued the physical and psychological demands of the sport and the pressure to succeed lead to anxiety, decreased performance, and in many cases, withdrawal from the sport. DiFiori et al. (2014) continued by noting there are multiple symptoms for young athletes with overtraining and burnout characteristics including fatigue, depression, irritability, and weight loss. It is clear the results of burnout due to sport specialization can be both physical and psychological (Brenner, 2016).

With regard to scholarships, most college coaches prefer multiple-sport athletes, because they are “ready to go” and not likely to be burned out (Shomper, 2011, p. 29). Multi-sport athletes are usually more adaptable, less concerned with being a star, and have better crossover skills (Shomper, 2011). This information is important to note when seeking to understand why students specialize in one sport.

In a recent interview, Dr. Steve Yemm stated, “The other negative that I see a lot of is there’s a huge incidence of just psychological burnout in kids” (Lytle, 2016, para. 13). Dr. Yemm continued:

They just get sick of it after a while. Many times if they’ve done it all the way through their grade school and middle school years, by the time they get to high school, lots of them, even if they don’t get hurt, get sick of it and quit. (Lytle, 2016, para. 13)

It is clear with specialization, there are greater chances of burnout and an early departure from sports (White & Oatman, 2009).

To address the concern of burnout, suggestions have been made. In 2007, Dr. Joel Brenner argued, “Prevention of burnout should be addressed by encouraging the athlete to become well rounded and well versed in a variety of activities rather than 1 particular sport” (p. 1242). To rephrase this, it is the multi-sport approach that best prevents the fatigue of single-sport participation.

Cost of Participation

Parents make substantial investments in their children and in participation in youth athletics (Killion, 2013). One reason is to give children specialized coaching in a highly competitive environment that may not be available in recreational leagues or schools (Killion, 2013). Another is to get them noticed by college coaches, who almost exclusively recruit at showcase tournaments (Killion, 2013). Regardless of reason, society has come to equate spending on kids’ sports lives with achievement in sports (Hyman, 2012). In his 2012 book entitled *The Most Expensive Game in Town: The Rising Cost of Youth Sports and the Toll on Today’s Families*, Mark Hyman stated, “For a surprising number of parents, just keeping their kids in sports requires financial sacrifice” (p. 15).

It is important to recognize children’s sports are a big business. Coaches, personal trainers, club team organizations, sporting goods manufacturers, tournament directors, and others have a financial stake in youth sports participation (DiFiori et al., 2014). Prettyman and Lampman (2011) supported this idea:

Many parents don't realize that the current emphasis on early specialization in youth sports is due in great part to the privatization and professionalization of youth sports. When sport clubs, both non-profit and commercial, hire staff and coaches, there needs to be a way of ensuring that payrolls, facility costs, and other expenses can be paid twelve months a year. The only way this can be done is to convince parents that year-round participation is in the best interest of their children, and that dues must be paid every month of the year. But this approach is grounded in the logic of economic profit, and it has nothing to do with the best interest of children. (p. 13)

David Caslow (2015) cited scholastic, collegiate, and club coaches are being paid more than ever and are becoming more reliant on the success of their athletes. Caslow (2015) continued by noting skyrocketing salaries of premier athletes and increasing college costs have promoted the hopes and dreams of using sports as a means of acquiring significant wealth. Caslow (2015) concluded, "Advertising endorsements to both professional and amateur athletes pour additional fuel on the burning desire of gaining wealth through sport" (p. 16).

With these changes of the youth sports landscape, commercial entrepreneurs have found a pot of gold at the end of the youth sports rainbow (Stewart & Shroyer, 2015). Stewart and Shroyer (2015) stated, "We have witnessed the birth of an industry. Private sport facilities, sponsored events, specialized agents and scouting firms have evolved to ease the way to future athletic rewards" (p. 12). Stewart and Shroyer (2015) continued by stating typically parents are in charge of private clubs, which are rarely governed by the philosophies or rules of public agencies or schools. Realizing the financial

implications of this governance structure, Stewart and Shroyer (2015) noted, “The club leaders depend on participants’ fees for operational expenses, and as costs increase, some parents find an elitist role in their children’s sport” (p. 11).

The Project Play (2015a) report by the Aspen Institute stated travel-team parents spend an average of \$2,266 annually on their child’s sports participation, and at the elite levels some families spend more than \$20,000 per year. In 2013, Ann Killion reported:

Many parents report spending up to \$3,500 a year to play summer and fall travel baseball; additional showcase tournaments can cost \$500 for a weekend slate of three games. Dues at elite volleyball clubs can run \$3,500, with another \$3,000 required for travel. At soccer clubs around the Bay Area, the costs are high: Some dues exceed \$4,000 a year. Uniforms, equipment and travel to distant tournaments are usually not included. (para. 7)

Pay to play costs are staggering.

The financial implications of organized sports are both socioeconomic and cultural. In a 2013 research brief by the University of Florida Sport Policy and Research Collaborative, it was noted introducing high doses of organized sports to children can cost thousands of dollars a year, so children whose families have the resources to pursue traveling club teams, private coaches, and expensive equipment inevitably acquire greater access to the sports pipeline that leads to scarce roster spots in college and even some high schools. David LaFerney (2016) further clarified by stating the more money a kid’s family makes, the better the access to sports—evidence of a socioeconomic divide among young athletes that affects black and Hispanic children more than any other group. It is important to note these divides between economic classes and cultural groups are creating

divides among participants in today's youth sports society (University of Florida Sport Policy and Research Collaborative, 2013).

The world seems obsessed with sport specialization, where academies charge tens of thousands of dollars in annual tuition to help children get better at football, basketball, soccer, and more (Associated Press, 2016). In response, Mark Rerick (2016) noted the increased time, cost, and effort commitment is not a guarantee anything awaits the athlete down the road. Although parents who can afford to are more likely to place their sons or daughters in a club program or on a travel team and are willing to incur the financial sacrifices required to develop a young athlete, they are also more likely to become frantic when their investments do not appear to be paying off (Caslow, 2015). Parents invest so much money, time, travel, and training that when their sons or daughters get to high school, parents expect a payoff in terms of playing time (Nikkel, n.d.).

Club Sports

A growing number of high school student-athletes are competing in non-school club sports programs across the country (Haddix, 2015). State association directors have expressed concerns about the growing influence of non-school sports on school-based athletic programs (Haddix, 2015). With changes in society leading to the expansion of travel teams and sport specialization, school programs are being devalued, which has led to concern regarding the future of high school athletics (Shomper, 2011).

In a 2015 publication, Cheatham and Little stated:

Young athletes increasingly are involved in high-level travel or club teams, are part of multiple teams simultaneously in the same sport, or seek extra training from sport-specific specialists. Theoretically, this high-intensity training will

foster the development of one sport's particular skill set. However, this structured environment may actually be detrimental to achieving elite status. It exposes young athletes to increasing demands on their developing musculoskeletal system and may have damaging effects on their psychosocial development. (p. 724)

There is little evidence specialization is the best or the only way to produce highly skilled athletes (Prettyman & Lampman, 2011). In other words, specialization may not pay off as many parents hope and as advertised by many sports clubs (Prettyman & Lampman, 2011).

An increase in specialization in youth sports has increased the popularity of private athletic clubs that charge parents thousands of dollars each year so their kids can play and travel around the country (Killion, 2013). This trend has altered the landscape of youth sports, turning many leagues into playgrounds for the privileged (Killion, 2013). As a result, sports like soccer, baseball, and volleyball are becoming upper-class sports in America (Killion, 2013). Additionally, because of the prevalence, access, and influence of club-based sports, more high school athletes specialize at an earlier age (Rerick, 2016).

The decline of multi-sport athletes is one of the leading concerns related to non-school sports participation voiced by high school leaders (Haddix, 2015). Since many of the seasons for non-school sports teams occur during the high school off-season, this encourages high school student-athletes to play and train year-round (Haddix, 2015). A survey of state associations indicated 21 states, including Michigan, do not permit same-sport/same-season competition (Haddix, 2015). Some of those states have exceptions for some individual sports, while others permit no exceptions (Haddix, 2015). The survey

revealed 23 states allow same-season/same-sport competition, with some states noting exceptions in certain sports (Haddix, 2015).

In his publication titled “Specialization and High School Sports,” Nikkel (n.d.) clarified more specifically by stating:

Another area that has helped fuel the concept of sport specialization is the whole AAU [Amateur Athletic Union] system, which has evolved into a major business. There are teams for literally any age you want. These out-of-school programs have fueled the idea of focusing on one sport. The pitch for the AAU teams is, “put in the time with us and we can get you a college scholarship.” If kids play another sport, it takes time away from becoming more proficient in the other sport. Granted, a college scholarship is nice, but there are a limited number of athletic scholarships available. (para. 9)

Club sports are a very real aspect to sport specialization and the high school student athlete.

Pressure to Specialize

There is increased pressure to participate at a high level, to specialize in one sport early, and to play year-round, often on multiple teams (Brenner, 2016). Often this pressure to specialize comes from an adult, either a coach or a parent (Rerick, 2016). The perception exists among many parents that to gain an edge toward achieving success, having their child specialize in a single sport at a young age is necessary (Myer et al., 2015b).

There are many other reasons students choose to specialize: early college recruiting; pressure from coaches saying if athletes work at it, they will get to play or

even start; weather/geography; socioeconomic factors; sport commercialization; increased pressure and opportunity to play with private club and travel teams; and the general influence of society for youth to be a productive age instead of an experimentation age (Shomper, 2011). By anyone's reckoning, adults rule youth sports (Hyman, 2009). Wojtys (2013) pointed out, "When kids commit or are committed to sports specialization, they enter a different arena where decisions are made by adults, not them" (p. 212).

As Hyman (2009) stated, it is not the presence of adults distorting youth sports; rather, the issue is the well-documented impulse to turn sports for children into a de facto professional league. For adults, it seems the fewer distinctions between the playing worlds of professionals and kids, the better (Hyman, 2009). Parental logic has become the more a child specializes in one sport, the better he or she will be (Stewart & Shroyer, 2015).

One of the goals of sport specialization is to optimize opportunities to develop athletic skills in one sport to enhance the chances of competing at the next level (Wojtys, 2013). Feeley et al. (2015) contended many factors contribute to the desire of parents and coaches to encourage early single-sport specialization. These factors include the desire to give the young athlete an "edge in competition, pursuit of scholarships, and potential professional status, and the ability to label a young athlete as elite at an early age" (Feeley et al., 2015, p. 234).

With one of the main causes of early specialization being parents who stress the pursuit of one sport for the sake of gaining college scholarships and professional recruiting buzz (Andrews & Yaeger, 2013), a child's self-esteem should also be taken

into account when considering age of specialization (White & Oatman, 2009). Children at younger ages are especially vulnerable to stress put on them by parents and coaches (White & Oatman, 2009). Mark Rerick (2016) supported this philosophy:

The last major detriment is the external pressure put on athletes to succeed.

Athletes who are encouraged to specialize in a sport for any reason are often placed on a pedestal by the adults around them. Specialization often occurs as a result of coaches or parents who want athletes to “be the best they can be” without acknowledging that there are many paths to that goal. The younger the kids are, the fewer coping skills they have acquired to deal with this kind of pressure. (p. 2)

Shomper (2011) noted the biggest reason parents encourage specialization is because they believe it is an investment in future scholarships, professional aspirations, or to win national championships with their travel team.

It is argued parents have increasingly become focused on athletic scholarships because of the notoriety it brings to families, money saved on college expenses, and the chance to thoroughly enjoy their child’s college experience (White & Oatman, 2009). Buchberger (2013) explained when looking at their children, parents see investment for a future scholarship, competitive edge, living out a dream, a future job playing sports, and winning a championship. When coaches see an athlete, they see an opportunity to improve their team and perhaps win a state title (Buchberger, 2013). In 2014, Eric Sondheimer reinforced this idea by stating there is pressure to specialize, and it comes from club coaches trying to market athletes to college coaches. It comes from high school coaches unwilling to share athletes with another team and from parents fearing focus on one sport might lessen success in another, costing a college scholarship

(Sondheimer, 2014). Regardless of the reasons, pressures to specialize are a reality for all athletes.

Head Basketball Coach Don Showalter noted specializing has become the rule rather than the exception (Dyer, 2015). Coach Showalter continued by clarifying athletes get an inflated view of what they are able to do in a sport based on information from people surrounding them, which has no basis (Dyer, 2015). As a result, the athlete will specialize, thinking this will lead them to a professional contract, which rarely happens (Dyer, 2015).

With all of the noted pressures to participate and focus on one sport, it was noted by Visek et al. (2015) that enjoyment is the most important factor in sustaining youth sport participation. Visek et al. (2015) stated, “Children cite fun as the primary reason for participation in organized sport and its absence as the number-one reason for youth sport attrition” (p. 424). Post et al. (2016) supported this idea of “fun” by determining sport enjoyment was rated by current Division I athletes as the most important factor in their eventual decision to specialize in their collegiate sport. Post et al. (2016) continued by pointing out the most common reason cited by athletes for choosing to specialize in their college sport was enjoying that sport the most. The second and third most-frequent selections were having an opportunity to earn a scholarship to play in college and being the best at that sport, respectively (Post et al., 2016). Only 9.9% of athletes in the Post et al. (2016) research cited parental influence as the most important factor in their decision to specialize in their college sport. The idea of “fun” was supported by the Riewald and Snyder (2014) survey titled, *The Path to Excellence: A View on the Athletic Development of U.S. Olympians Who Competed from 2000-2012*, which revealed challenge or love of

competition, desire to be successful, competitive outlet, and fun were the highest-rated motives to pursue excellence in sport.

It takes time for most kids to identify their natural talents and interests (Caslow, 2015). Caslow (2015) continued by stating the average kid will try numerous sports activities and even retry them before turning the heart over to a favorite. Caslow (2015) asserted, “Adults need to be patient while kids explore and then nurture the choices they make” (p. 16).

One of the best ways to promote exploration of sport in young athletes is the idea of free play (Myer et al., 2015b). Myer et al. (2015b) argued youth should be given opportunities for free, unstructured play to improve motor skill development, and parents and educators should encourage child self-regulation to help limit the risk of overuse injuries. Rerick (2016) agreed with this idea by proposing:

One of the biggest issues we face with all kids in youth sports today is the overscheduling and over-organization of sports. Kids who are allowed time to free play – outside of the structure of organized sports – tend to be more creative, have better basic motor skills, learn more social/emotional skills, and find ways to just have fun while playing. Kids who are taking year-round lessons or moving from team to team and miss out on the opportunity to grab some friends, roll out the ball and just play. (p. 2)

Unfortunately, in a climate of intense competition, instant gratification, and commercialization of athletics, free-play situations are rare (Caslow, 2015).

For today’s youth athlete, specialization has become a prerequisite for playing on certain high school teams and elite club teams where players come out of a preparatory

pipeline that gives them the “sports resume” favored by high school and college coaches (Prettyman & Lampman, 2011, p. 12) This has forced kids into sports that often are not of their own choosing, and in many cases compels young people to remain in activities that are not enjoyable, not intrinsically motivating, nor are congruent with their actual athletic abilities (O’Sullivan, 2014). Stakeholders often fail to consider many of the physical, emotional, and social costs to children who only play a single sport (O’Sullivan, 2014).

When considering what pressures exist to sport specialize, it was noted good communication and understanding among the youth athlete, his or her parents, and the coach—about goals, expectations, motivations, and the like—optimize the outcomes for a healthy successful youth athlete (Hong, 2013). The Aspen Institute’s Project Play (2015b) explained further by stating most children flow into only a handful of the more than 120 sports played in the United States. In addition, as early as the grade school years, those identified as having the most promise get the message from coaches and others they must specialize in one sport at the exclusion of others in order to fully develop their talents and play at a college, professional, or other elite level (Project Play, 2015b). Project Play (2015b) then countered with, “It’s a myth... grow the menu of sport options, create better connections to vulnerable populations, and more athletes-for-life will emerge” (p. 16). As noted by Andrews and Yaeger (2013), it is the responsibility of adults to protect kids. Adults must stand up for children and help them make healthy choices in their athletic participation (Andrews & Yaeger, 2013).

Prevalence of Specialization

In 2016, Bell et al. concluded school size influences the prevalence of sport specialization. Bell et al. (2016) clarified, “Athletes from the larger high school were more likely to be highly specialized than athletes from the smaller high school, which may be a response to increased competition for roster spots” (p. 1473). Rob Cuff, Executive Director of the Utah High School Activities Association, concurred, “It’s very uncommon to find multi-sport athletes in the bigger schools. The kids are specializing in one sport and going for the scholarship” (as cited in Robinson, 2015, para. 11).

Project Play (2016) determined the average child between the ages of six and 17 played less than two team sports (1.89). Project Play (2016) noted the downward trend in multi-sport athletes has continued even though the evidence base has shown specializing in one sport is harmful to the body, and playing multiple sports is protective. Additionally, the USOC (2014) sought to better understand Olympians’ participation in sport activity. The findings indicated surveyed Olympians were involved in an average of three sports per year until the age of 14. From 15-18 years of age, however, athletes reported participating in an average of 2.2 sports per year (USOC, 2014). These findings supported Post et al. (2016), who noted specialization increases as age increases. Post et al. (2016) clarified specialization of high school athletes increases as students progress through school, and the majority of Division I athletes in their research were not classified as highly specialized throughout high school.

Benefits of Multiple-Sport Participation

Myer et al. (2015b) argued youth should be encouraged to participate in a variety of sports during their growing years to influence the development of diverse motor skills

and to identify a sport, or sports, the child enjoys. Cheatham and Little (2015) continued, “Participation in multiple sports into adolescence may enhance a young athlete’s chance of attaining elite status in one particular sport” (p. 725). The possibility of achieving elite status through multiple-sport participation was reinforced when Spilbeler (2016) documented 2013-2016 National Football League first-round picks were over two times more likely to have played three sports in high school than to have specialized in football only. Spilbeler (2016) went on to state, “Year after year we find that multiple sport athletes are drafted at a much higher percentage than those that specialized in football as preps” (para. 1).

In their 2014 publication titled, *American Development Model: Rebuilding Athletes in America*, the USOC noted multi-sport participation is critical to developing a well-rounded foundation for physical activity that can transfer between sports. The USOC (2014) argued encouraging children to participate in multiple-sport activities at a young age offers them the opportunity to explore, play, and discover sport according to their personal interests and skill levels. Multi-sport play also provides several cross-training benefits for athletes such as strength, endurance, agility, coordination, and speed training, all of which enhance athleticism and promote a healthy lifestyle (USOC, 2014). Athletes also benefit from the social and psychological impact of multi-sport participation (USOC, 2014). Participating in a variety of sports allows athletes to become more athletically diverse and adaptable (Balyi et al., 2013).

The many benefits of multi-sport participation are clear for the 93% of high school athletes who will not advance to college athletics (Rerick, 2016). Similarly, there

are tangible benefits for those 7% of athletes moving on, too (Rerick, 2016). Rerick (2016) explained:

In addition to the athlete's sport-specific skill level, college coaches want to know how an athlete moves, how an athlete thinks, how good of a teammate the athlete is, how the athlete deals with adversity, and how the athlete competes. All of these can be easier to witness when an athlete is playing a sport that comes less naturally to them. In addition, there are plenty of cross-sport skills that can be learned in one activity then applied to others. Athletes can learn or enhance their hand-eye coordination, balance, endurance, explosion, communication or athletic agility by participating in a variety of sports. The athletes who are genetically gifted can still benefit greatly from participating in many different sports. (p. 2)

Children should participate in a variety of sports with qualified youth coaches who have the necessary knowledge and skills to organize and monitor age-related training and adaptations so children are more likely to experience long-term success as competitive athletes (Myer et al., 2015b).

Competing in a variety of sports can be essential to proper growth and development as a child (White & Oatman, 2009). White and Oatman (2009) continued, "Children who participate in multiple sports, as youth, will gain an increase in multilateral skills, build self-esteem, and develop physically and emotionally and avoid sports burnout in adolescence" (p. 13). Myer et al. (2015b) clarified even further by warning lack of diversified activity may not allow young athletes to develop the appropriate neuromuscular skills effective in injury prevention and does not allow for necessary rest from repetitive use of the same segments of the body.

For multiple-sport participation, improved health and wellness is one of the benefits (Shomper, 2011). Shomper (2011) continued by proposing:

Students who participate in more than one sport have reduced risk of overuse injuries and stress that leads to burnout. There are many health benefits to varied physical activity. Benefits of multiple-sport participation outweigh sport specialization. Multiple-sport students also show improved athletic performance. Cross-training (using different muscles and skills) leads to better athleticism, better leadership and teamwork skills, and better mental development, and makes it easier for multiple-sport students to pick on new skills. Being involved in more sports leads to character development as well. Students may not excel in all of their sports, so they learn humility and teamwork. They also learn from the different coaching styles and personalities in the different sports. Multiple-sport participation also provides improved coaching. School coaches understand that there is more to teaching our students than just the sport. Being with our school coaches is better for our students than being with a select or travel coach who may not worry about teaching life lessons. There are many CEOs of major companies who believe that hiring a person who was a multiple-sport participant is important because people who do multiple things are capable of handling different situations. (p. 29)

There are many benefits cited in support of multi-sport participation, but health might be the most important (Lytle, 2016). Buchberger (2013) agreed by stating the lifetime benefits of multiple-sport participation are physical, psychological, and social.

In addition to multi-sport athletes displaying improved health and wellness and decreased rates of injury in improved athletic performance (Buchberger, 2013), it is suggested factors other than specialization may play a larger role in the ability to advance to elite levels of sport competition (Post et al., 2016). In their 2016 research titled “High School Sport Specialization: Patterns of Current Division 1 Athletes,” Post et al. clarified elite and national team athletes specialize later and participate in more sports during high school than non-elite athletes. The concept of multiple sport participation contributing to preparedness for elite-level play was reinforced by Coach Tony Strudwick, winner of 13 fitness coach titles with the elite soccer team Manchester United (O’Sullivan, 2015). His advice was a multi-sport background prior to the age of 12 set up soccer players for long-term success by lowering rates of injury and making them more adaptable to the demands of elite-level play (O’Sullivan, 2015). He clarified by stating more often than not, the best athletes in the world are able to distinguish themselves from the pack thanks to a range of motor skills beyond what is typically expected (O’Sullivan, 2015).

While specialization is a booming and concerning trend in youth sports, with athletes as young as 10 years old focusing solely on one discipline as competition for college scholarships and professional careers reaches extreme levels, the U.S. women’s soccer team has been seen as proof such an approach is not the only route to success (Rogers, 2015). A survey of members of the squad revealed collectively they played at least 14 different sports competitively while growing up, in addition to soccer (Rogers, 2015). And significantly, all expressed the other disciplines enhanced rather than hindered their soccer careers (Rogers, 2015).

Organizations at Work

Position statements by multiple medical organization regarding sport specialization have been made. Although slightly different in language, no single position statement supports early sport specialization (Ferguson & Stern, 2014).

Organizations that have issued position statements include The American Academy of Pediatrics, The National Athletic Trainers Association, and the World Health Organization (Ferguson & Stern, 2014).

Further, more than 40 national and international sports organizations have joined a movement called “Project Play,” which advocates the multi-sport experience as the safer, healthier, and happier sports participation journey (Michigan High School Athletic Association, 2016). In response to the 2016 Project Play report, the United States Tennis Association rallied more than 45 national sport bodies to take a mutual action of endorsing multi-sport play for all children at least through age 12 (Project Play, 2016). Signing on to the endorsement were the U.S. Olympic Committee, the NCAA, most of the national sport-governing bodies, and all the major professional leagues, as well as the Robert Wood Johnson Foundation, NBC Sports, ESPN, and the President’s Council on Fitness, Sports & Nutrition (Project Play, 2016).

In 2014, Major League Baseball, in partnership with USA Baseball, and with input from top sports medicine physicians and researchers, launched “Pitch Smart,” an arm-safety initiative for youth players (Brandpoint, 2016). A series of practical, age-appropriate guidelines to help parents, players, and coaches avoid overuse injuries, these guidelines advise a maximum pitch count of 50 for seven- to eight-year-olds, increasing incrementally up to 120 pitches by age 22 (Brandpoint, 2016). According to the

American Orthopedic Society for Sports Medicine, there has been a five-fold increase since 2000 in the number of serious elbow and shoulder injuries among youth baseball and softball players (as cited in Kroichick, 2013). The organization helped launch StopSportsInjuries.org, a website devoted to educating parents and young athletes about sports injuries (Kroichick, 2013). Similarly, noting growing concerns for health risks to young people who specialize too early and narrowly on a single sport, the Michigan High School Athletic Association (2016) created a task force to work throughout 2016 on promoting the benefits of multi-sport participation.

Perceptions of Athletes

In the 2014 Riewald and Snyder publication titled, *The Path to Excellence: A View on the Athletic Development of U.S. Olympians who Competed from 2000-2012*, Olympians were asked, “Growing up, would you consider yourself as having been a multisport athlete as you developed?” (p. 35). In response, 71% of Olympic athletes who completed the survey considered themselves multi-sport athletes (Riewald & Snyder, 2014). As a further means of analysis, only those Olympians considered to be multi-sport athletes were asked about the value of participating in multiple sports (Riewald & Snyder, 2014). Of the 213 multi-sport athlete responses, 97% expressed participating in multiple sports was either valuable or very valuable in their athletic careers (Riewald & Snyder, 2014). In the 2014 Riewald and Snyder survey, the question “How valuable was playing different or multiple sports in your development as an athlete?” was presented (p. 36). Olympian responses clarified 88% felt playing several different sports was either valuable or very valuable to their athletic development (Riewald & Snyder, 2014). This

reinforces the idea a large percentage of Olympic athletes perceive multiple-sport participation contributes to greater success at the elite level.

In his recent Baseball Hall of Fame induction speech, former Atlanta Brave pitcher John Smoltz reminded the audience of his own Tommy John surgery and how the injury kept him out of the sport for a year (MLB.com, 2015). He claimed the surgery was an “epidemic” in the sport and pleaded with parents of young players:

I want to encourage the families and parents that are out there to understand that this is not normal to have a surgery at 14 and 15 years old. That you have time, that baseball is not a year-round sport. That you have an opportunity to be athletic and play other sports. Don't let the institutions that are out there running before you guaranteeing scholarship dollars and signing bonuses that this is the way. We have such great, dynamic arms in our game that it's a shame we're having one and two and three Tommy John recipients. So I want to encourage you, if nothing else, know that your children's passion and desire to play baseball is something that they can do without a competitive pitch. Every throw a kid makes today is a competitive pitch. They don't go outside, they don't have fun, they don't throw enough – but they're competing and maxing out too hard, too early, and that's why we're having these problems. So please, take care of those great future arms. (MLB.com, 2015, 24:51)

Smoltz is one of several professional athletes making position statements concerning sport specialization (MLB.com, 2015).

In Hyman's 2009 book, *The Most Expensive Game in Town: The Rising Cost of Youth Sports and the Toll on Today's Families*, Tommy John, the pitcher whose name is associated with the famous elbow surgery, stated:

I could give thirty lessons a week at \$100 a lesson during the winter – just to eight to twelve-year old's. I refuse to do it . . . Those kids do not need to be playing baseball year-round. What parents do not understand, and will never understand, is it makes no difference whether you start at eight or eighteen. I can take a kid who has never pitched in his life until he is seventeen. By the time he is nineteen he will throw as well as or better than the kid who has been pitching since he was eight . . . and with less wear and tear on his arm. (p. 20)

The concept multiple-sport participation is beneficial was reinforced by Lauren Holiday of the United States Women's Soccer team when she stated, "Doing different things develops different parts of your body. It can help prevent injuries and definitely help prevent burnout" (as cited in Rogers, 2015, para. 8).

When considering multiple-sport participation, several additional members of the United States Women's Soccer Team noted its benefits. When asked about multiple-sport participation, Lauren Holiday stated, "Having that variety is an awesome thing and I would encourage any young athlete or parent not to restrict themselves" (Rogers, 2015, para. 7). When asked the same question, United States Women's Soccer teammate Abby Wambach stated, "I understand the argument of people being one sport athletes at a young age, but for me and my personality I would get burned out as a young kid playing just one sport" (as cited in Rogers, 2015, para. 13).

Summary

In conclusion, there are many factors to keep in mind when considering sport specialization or multiple-sport participation. In Chapter Four, data are reviewed for approximately 1,500 student athletes from southwest Missouri to clarify if there are significant differences in behavior and academics between single-sport and multiple-sport athletes. This information is presented in tables, figures, and written format to reveal potential benefits or drawbacks to both single-sport and multiple-sport participation for student athletes.

Chapter Three: Methodology

Problem and Purpose Overview

Sport specialization is becoming the norm in youth sports for a variety of reasons (Brenner, 2016). One of the greatest causes of injury in student athletes is sport specialization (Andrews & Yaeger, 2013). One of the biggest debates in high school sports today is whether student athletes should play multiple sports or specialize in just one (Rerick, 2016). Since almost half of all sports injuries are related to overuse (Andrews & Yaeger, 2013), many health organizations have adopted position statements regarding the practice of sport specialization (Ferguson & Stern, 2014).

In his 2016 report for the American Academy of Pediatrics titled “Sport Specialization and Intensive Training in Young Athletes,” Dr. Joel Brenner described:

Youth sports culture has changed dramatically over the past 40 years. It is less common today to see a group of young children congregate in a neighborhood to play a “pick-up” game without any adult influence. The norm has become for children and adolescents to participate in organized sports driven by coaches and parents, often with different goals for the game than its young participants. It is also less common now to have a multisport athlete in middle or high school, because the norm has become for young athletes to specialize in a single sport at younger ages. There is increased pressure to participate at a high level, to specialize in 1 sport early, and to play year-round, often on multiple teams. This increased emphasis on sports specialization has led to an increase in overuse injuries, overtraining, and burnout. (p. e1)

Noting these growing concerns for potential risks to young people who sport specialize, the Michigan High School Athletic Association created a task force to work throughout 2016 on promoting the benefits of multi-sport participation (Michigan High School Athletic Association, 2016). In addition to efforts like that of the Michigan High School Athletic Association, many other national organizations have begun to preach about the concerns of sport specialization including the American Academy of Pediatrics, the National Athletic Trainers Association, and the American Medical Society for Sports Medicine (Ferguson & Stern, 2014).

This research was designed to clarify if significant differences exist in academic and behavioral performance between high school athletes who compete in one sport and high school athletes who compete in multiple sports. Grade point average was investigated to clarify academic differences, while attendance and discipline were examined to clarify behavior. Currently there is mounting research centered on sport specialization and potential risks including injury, burnout, and overall child health (Brenner, 2016). However, research reports regarding the academic and behavioral implications of sport specialization are difficult to find.

Research questions and hypotheses. The following research questions and hypotheses guided the study:

1. What is the difference, if any, in annual non-weighted GPA for high school athletes who compete in one sport and high school athletes who compete in multiple sports?

H₁₀: There is no difference in annual non-weighted GPA for high school athletes who compete in one sport and high school athletes who compete in multiple sports.

H1_a: There is a statistically significant difference in annual non-weighted GPA for high school athletes who compete in one sport and high school athletes who compete in multiple sports.

2. What is the difference, if any, in annual hours absent for high school athletes who compete in one sport and high school athletes who compete in multiple sports?

H2_o: There is no difference in annual hours absent for high school athletes who compete in one sport and high school athletes who compete in multiple sports.

H2_a: There is a statistically significant difference in annual hours absent for high school athletes who compete in one sport and high school athletes who compete in multiple sports.

3. What is the difference, if any, in annual days suspended for high school athletes who compete in one sport and high school athletes who compete in multiple sports?

H3_o: There is no difference in annual days suspended for high school athletes who compete in one sport and high school athletes who compete in multiple sports.

H3_a: There is a statistically significant difference in annual days suspended for high school athletes who compete in one sport and high school athletes who compete in multiple sports.

Rationale for Quantitative Research

The methodology chosen for this research was the quantitative approach. Quantitative research requires specific, narrow questions be asked to obtain measurable and observable data on variables (Creswell, 2013). Creswell (2013) contended there are

six purposes for conducting educational research including addressing gaps in knowledge, expanding knowledge, replicating knowledge, adding voices of individuals to knowledge, adding to knowledge, and improving practice. By collecting and dissecting quantitative data, researchers are able to serve at least five of these purposes (Creswell, 2013). This research included investigation of numerical data in such a way decisions can be better-advised when considering single-sport or multiple-sport participation.

Ethical Considerations

The researcher established several safeguards throughout the data collection and analysis phases. The safeguards included the following:

To assure confidentiality. All documents including Excel spreadsheets, MSHSAA rosters, and this document were stored in a password-protected digital format on an electronic device stored in a locked room. All documents and files pertaining to this research will be destroyed three years after completion of this research project.

To assure anonymity. To assure anonymity, the data requested from participating districts were non-identifiable. Participating districts were directed to remove the names of students whose data were made available. Data returned to the researcher only included the following for the 2015-2016 school year: gender, grade level, number of sports participated in, GPAs, hours absent, and days suspended.

To assure anonymity, none of the districts who chose to participate in this research were identified by name. Only the general characteristics of MSHSAA classification and geographic location in southwest Missouri were detailed.

Overall. Each participating school district received an electronic mail message which described in detail the purpose of the research, any possible risks, and the opportunity to opt out of the study at any time without negative effects (see Appendix A).

Population and Sample

The population for this research included all high school athletes in Missouri for the 2015-2016 school year. During the 2015-2016 school year, approximately 162,000 students participated in athletics at the high school level in Missouri (J. West, personal communication, September 6, 2016). Bell et al. (2016) concluded school size influences the prevalence of sport specialization in high school athletes. Therefore, this research included two high schools representing Classes 1 and 2, two high schools representing Classes 3 and 4, and two high schools representing Class 5 in the Missouri basketball classification system (MSHSAA, 2016). This approach covered all five classification categories, and therefore, all enrollment sizes of high schools in Missouri (MSHSAA, 2016).

The MSHSAA (2016) uses senior high school enrollment figures (grades 9-12) for classification purposes. The MSHSAA (2016) gathers the official enrollments of member high schools every two years in order to set activity classifications for a two-year cycle. Then the MSHSAA (2016) divides member high schools into a maximum of six classes, based on the number of schools registered for districts in the activity, for competition in district and state athletic tournaments or meets.

All schools in this research offer basketball for both boys and girls; therefore, the classification system for basketball was utilized. The MSHSAA (2016) classifies basketball as follows: the smallest 128 schools registered for districts in basketball (based

on official enrollments) comprise Class 1; the next smallest 128 schools are in Class 2; the next 128 schools are in Class 3; the next 96 schools comprise Class 4; and the remaining schools, the largest based on official enrollments, comprise Class 5.

The sample for this research included students who were recorded on MSHSAA (2016) eligibility rosters for their participation in sports at the six schools selected for participation in this study. Eligibility rosters with names of student athletes were printed from the MSHSAA (2016) website for schools who were willing and able to participate in the study. These lists of names were then provided to participating schools at which point the schools provided the researcher with requested data for each student.

Creswell (2013) noted sample size can be as few as 15 participants in each group in an experiment but also noted, “The larger the sample, the less potential for error that the sample will be different from the population” (p. 146). The sample of nearly 1,500 students in this research thus reduced the chance for the sample to be different from the population. This research included a purposeful sampling. A purposeful sampling technique was chosen, because schools of various sizes were intentionally selected to represent a majority of schools based on size in Missouri (Creswell, 2013). Additionally, this research was based upon a convenience sampling approach. This approach was chosen because schools selected were willing and available to be studied (Creswell, 2013).

Data Collection

Data collection for this research included the collection of official MSHSAA eligibility rosters as recorded on the MSHSAA (2016) website for school district personnel reference. This database was accessed with school personnel credentials held

by the researcher, and existing athletics rosters were printed off into Microsoft Excel format (MSHSAA, 2016). The MSHSAA (2016) website has an automatic function to print official MSHSAA eligibility rosters into Excel format.

Once the athletic rosters were printed in Excel format, the names were copied and pasted onto one master list of names for each participating school. This master list was alphabetically sorted to place all repeating names next to each other. The number of times the duplicated names appeared was recorded to show the number of sports each student participated in that school year. All duplicate names were then deleted, leaving just the original name and the number of sports each particular student played. Finally, an additional column was created to designate each student's gender for further analysis of the data.

The completed master list of students who participated in sports during the 2015-2016 school year which includes names, number of sports participated in, and gender of student athletes was then sent to participating schools. To ensure anonymity, cooperating districts removed the student names attached to GPAs, hours of absence, and days of suspension and then emailed the sheet of anonymous data back to the researcher.

Data Analysis

For the initial analysis, all data received from participating schools were compiled onto one spreadsheet. Once all data from all participating schools were combined into one spreadsheet, multiple analysis of variance [ANOVA] tests were conducted to determine if there were significant differences among students in one sport, two sports, and three or more sports for GPAs, days of absence, and days of suspension, respectively. An ANOVA test should be applied when determining if there is a significant difference

among three or more mean averages (Bluman, 2012). The ANOVA test compared the mean averages for all three sets of data which included athletes of one, two, and three or more sports to determine if a significant difference existed for GPAs, hours of absence, and days of suspension, respectively.

If the ANOVA test indicated a significant difference within each category of the three groups of data including one sport, two sports, and three or more sports, a Tukey Honestly Significant Difference (HSD) post-hoc analysis was then utilized to determine where the specific differences existed. The Tukey HSD was utilized to determine if the significant differences in averages existed between one and two, one and three, or two and three or more sport athletes. The level of significance was set at .05 for the ANOVA test. This is a common level of significance in educational research where accuracy is important (Creswell, 2013). Further data analysis included determining if significant differences existed within specific genders and if significant differences existed within specific-sized schools.

Summary

Nationwide there is an increase in the practice of sport specialization (Rerick, 2016); however, sport specialization comes with risks (Brenner, 2016). To help student athletes, parents, coaches, and everyone involved in extracurricular activities make informed decisions, this researcher sought to clarify if there are academic and/or behavioral differences between students who play one sport and students who play multiple sports. This research was designed to help clarify if there is a significant difference in GPAs, days of absence, and days of suspension between student athletes who participate in one sport and student athletes who participate in multiple sports.

Since school size influences the prevalence of specialization (Bell et al., 2016), this research included investigation of data from six high schools of varying sizes in southwest Missouri. Participating schools were asked to provide anonymous data including GPAs, hours of absence, and days of suspension for their student athletes for the 2015-2016 school year. Once the above-mentioned data were received by the researcher, the ANOVA test was performed to determine if there are significant differences between students who participated in one sport, two sports, and three or more sports for each of the categories listed.

In Chapter Four, the statistical analysis for each of the groups of data are presented. First, GPAs were examined to clarify if there is a significant difference in academic performance of students who participate in one sport and students who participate in multiple sports. Next, hours of absence and days of suspension were examined separately to clarify if significant differences exist in behavioral performance between students who participate in one sport and students who participate in multiple sports. Finally, if the ANOVA test determined significant differences existed in any of the above categories, a post-hoc analysis consisting of a Tukey HSD test was performed to determine where exactly these differences existed.

Chapter Four: Analysis of Data

Pressures for student athletes to specialize in a single sport are increasing at an alarming rate (Brenner, 2016). This study was designed to clarify if students who participate in multiple sports and students who participate in a single sport demonstrate significant differences in academic and behavioral performance. Grade point averages were utilized to measure academic performance, while hours absent and days suspended were utilized to measure behavioral performance. This study was completed with student data from six high schools in southwest Missouri that vary in size to represent a majority of high schools in the state.

The data in this chapter are presented in various groupings aligned with existing research regarding sport specialization. First, student data are grouped using all student athletes from all schools in the study. Second, data are disaggregated into gender groups representing male and female. Athletics in the state of Missouri tends to be gender-specific (MSHSAA, 2016); therefore, it was important to investigate any differences within each gender. Third, data are presented by school size. Student data from two schools in Class 1 and 2, two schools in Class 3 and 4, and two schools in Class 5 were utilized in this research. Since Bell et al. (2016) concluded school size impacts specialization rates in student athletes, it is important to clarify what differences exist within each category of school size. And fourth, data are presented by grade level. Since data were collected from students in grades 9-12 and Post et al. (2016) determined specialization increases as age increases, clarifying what differences exist at different age levels was highly relevant.

Analysis of GPA

As shown in Figure 1, data reflect the average GPA for all student athletes from all school sizes reviewed in this research.

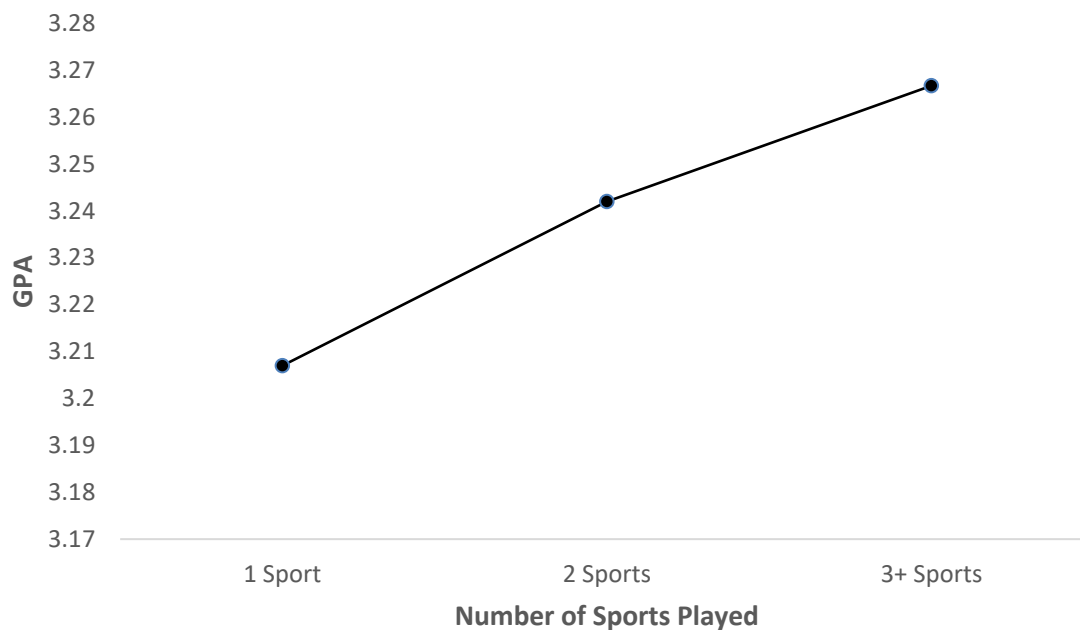


Figure 1. Average 2015-2016 GPA for all athletes from all schools based upon number of sports played.

Average student GPAs slightly increased from 3.2073 to 3.2420 to 3.2667 as number of sports participated in increased respectively from one to two to three or more. This data set includes all student athletes from all school sizes. A summary of these data is represented in Table 1.

Table 1

Summary of One-Way ANOVA Data – Average 2015-2016 GPA for All Athletes from All Schools Based Upon Number of Sports Played

Sports	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	Minimum	Maximum
1	935	3.2073	.69725	.02280	.00	4.00
2	416	3.2420	.62143	.03047	.73	4.00
3+	116	3.2667	.55053	.05112	1.75	4.00

A one-way ANOVA test was performed to determine if significant differences existed in the data. The level of significance for this test was set at 95% with an alpha level of 0.05. To determine statistical significance, the *p*-value was compared to the alpha level. For this data set, the *p*-value ($p = 0.509$) was greater than the alpha level of 0.05; therefore, there were no statistically significant differences between the means. As a result, the null hypothesis was not rejected clarifying no significant difference in GPA between all athletes existed. The results of the ANOVA test are represented in Table 2.

Table 2

One-Way ANOVA for GPA for All Athletes from All Schools

	Sum of Squares	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Between Groups	.600	2	.300	.676	.509
Within Groups	649.188	1464	.443		
Total	649.788	1466			

Note. Alpha level set at .05.

As shown in Figure 2, data reflect the average GPA by gender for student athletes from all school sizes reviewed in this research.

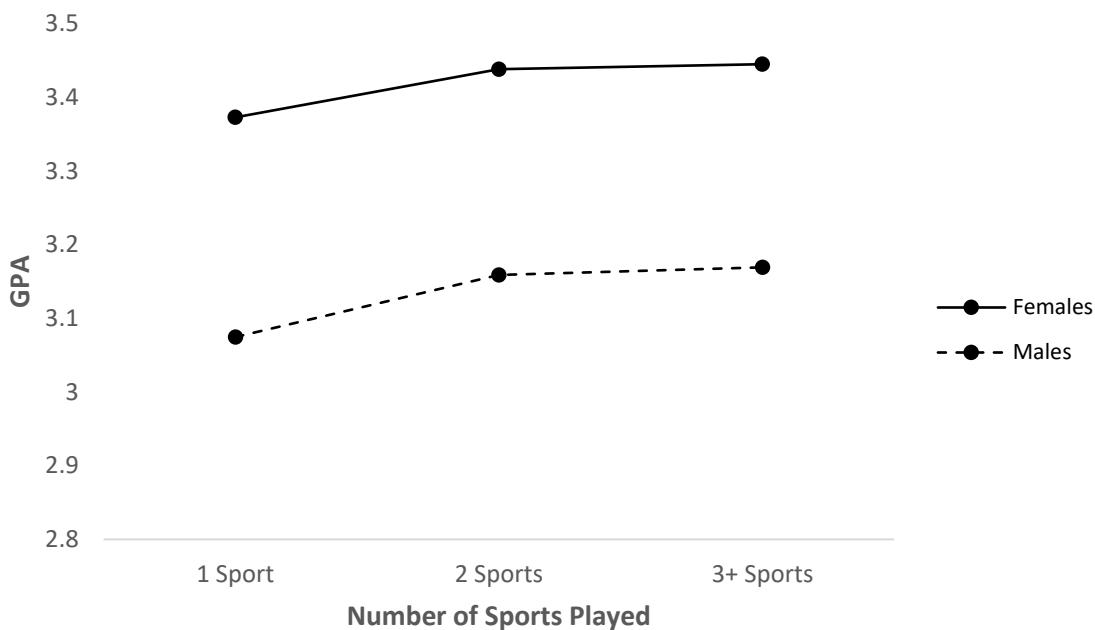


Figure 2. Average 2015-2016 GPA by gender for athletes from all schools based upon number of sports played.

Average female student GPA slightly increased from 3.3728 to 3.4381 to 3.4449 as number of sports participated in increased respectively from one to two to three or more. Average male student GPA slightly increased from 3.0746 to 3.1587 to 3.1692 as number of sports participated in increased respectively from one to two to three or more. A summary of these data is represented in Table 3.

Table 3

Summary of One-Way ANOVA Data – Average 2015-2016 GPA by Gender for Athletes from All Schools Based Upon Number of Sports Played

Sports	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	Minimum	Maximum
Female						
1	416	3.3728	.59079	.02897	.67	4.00
2	124	3.4381	.56422	.05067	1.00	4.00
3+	41	3.4449	.54900	.08574	1.75	4.00
Male						
1	519	3.0746	.74653	.03277	.00	4.00
2	292	3.1587	.62676	.03668	.73	4.00
3+	75	3.1692	.52996	.06119	1.83	3.98

One-way ANOVA tests were performed to determine if significant differences existed in the data. The level of significance for this test was set at 95% with an alpha level of 0.05. To determine statistical significance, the *p*-value was compared to the alpha level. For this data set, the female *p*-value ($p = 0.458$) was greater than the alpha level of 0.05; therefore, there were no statistically significant differences between the means. As a result, the null hypothesis was not rejected clarifying no significant difference in GPA for female athletes existed. For this data set, the male *p*-value ($p = 0.188$) was greater than the alpha level of 0.05; therefore, there were no statistically significant differences between the means. As a result, the null hypothesis was not rejected clarifying no significant difference in GPA for male athletes existed. The results of the ANOVA test are represented in Table 4.

Table 4

One-Way ANOVA for GPA by Gender for All School Classifications

	Sum of Squares	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Female Athletes					
Between Groups	.531	2	.266	.783	.458
Within Groups	196.061	578	.339		
Total	196.592	580			
Male Athletes					
Between Groups	1.605	2	.802	1.672	.188
Within Groups	423.784	883	.480		
Total	425.388	885			

Note. Alpha level set at .05.

As shown in Figure 3, data reflect the average GPA by school classification for all athletes in this research.

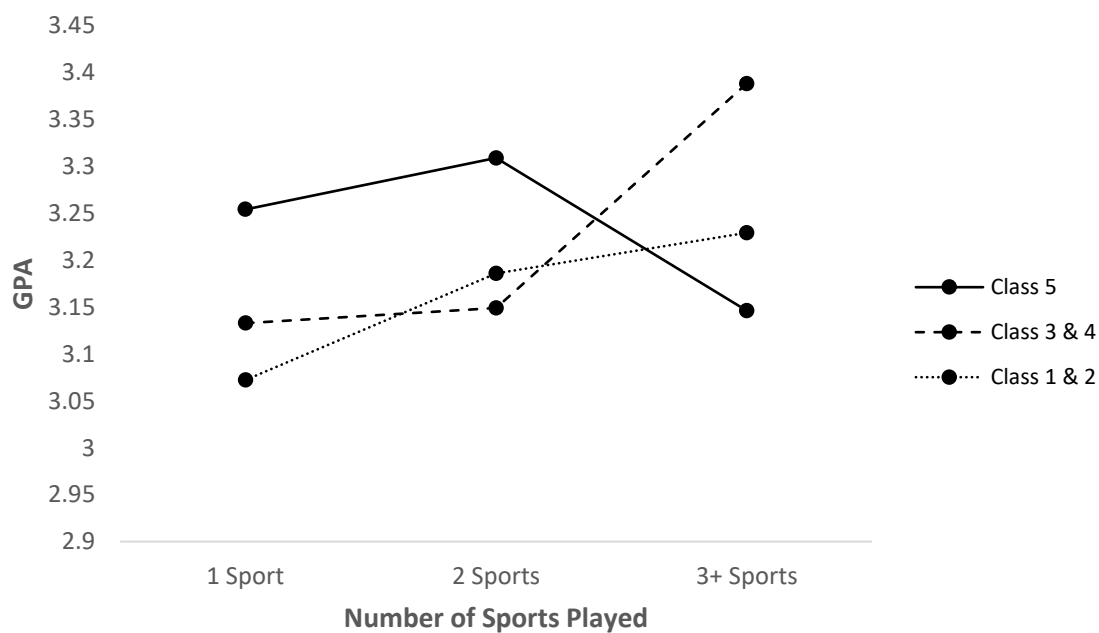


Figure 3. Average 2015-2016 GPA by school classification for all athletes based upon number of sports played.

Class 5 average student GPA slightly decreased from 3.2542 to 3.3091 to 3.1462 as number of sports participated in increased respectively from one to two to three or more. Class 3 and 4 average student GPA slightly increased from 3.1329 to 3.1490 to 3.3884 as number of sports participated in increased respectively from one to two to three or more. Class 1 and 2 average student GPA slightly increased from 3.0723 to 3.1861 to 3.2293 as number of sports participated in increased respectively from one to two to three or more. A summary of these data is represented in Table 5.

Table 5

Summary of One-Way ANOVA Data – Average 2015-2016 GPA by School Classification for All Athletes Based Upon Number of Sports Played

Sports	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	Minimum	Maximum
Class 5						
1	638	3.2542	.69684	.02759	.00	4.00
2	229	3.3091	.64685	.04274	.73	4.00
3+	34	3.1462	.72382	.12413	1.75	4.00
Class 3 and 4						
1	230	3.1329	.66432	.04380	1.22	4.00
2	133	3.1490	.62212	.05394	1.58	4.00
3+	45	3.3884	.40824	.06086	2.22	4.00
Class 1 and 2						
1	67	3.0723	.67199	.08210	.67	3.95
2	54	3.1861	.46438	.06319	2.14	4.00
3+	37	3.2293	.50054	.08229	1.86	3.96

One-way ANOVA tests were performed to determine if significant differences existed in the data. The level of significance for this test was set at 95% with an alpha level of 0.05. To determine statistical significance, the *p*-value was compared to the alpha level. For this data set, the Class 5 *p*-value ($p = 0.346$) was greater than the alpha

level of 0.05; therefore, there were no statistically significant differences between the means. As a result, the null hypothesis was not rejected clarifying no significant difference in GPA for Class 5 athletes existed. For this data set, the Class 1 and 2 p -value ($p = 0.338$) was greater than the alpha level of 0.05; therefore, there were no statistically significant differences between the means. As a result, the null hypothesis was not rejected clarifying no significant difference in GPA for Class 1 and 2 athletes existed. For this data set, the Class 3 and 4 p -value ($p = 0.042$) was less than the alpha level of 0.05; therefore, statistically significant differences existed between the means of each group. As a result, the researcher rejected the null hypothesis and accepted the alternative hypothesis that a significant difference existed in GPA between single- and multiple-sport athletes in Class 3 and 4. The results of the ANOVA test are represented in Table 6.

Table 6

One-Way ANOVA for GPA by School Classification for All Athletes

	Sum of Squares	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Class 5 Schools					
Between Groups	.999	2	.500	1.063	.346
Within Groups	422.003	898	.470		
Total	423.002	900			
Class 3-4 Schools					
Between Groups	2.517	2	1.259	3.196	.042
Within Groups	159.482	405	.394		
Total	161.999	407			
Class 1-2 Schools					
Between Groups	.708	2	.354	1.091	.338
Within Groups	50.252	155	.324		
Total	50.960	157			

Note. Alpha level set at .05.

A post-hoc Tukey HSD test was then conducted for class 3 and 4 athletes to determine where significant differences existed. Results of the Tukey post-hoc analysis indicated a significant difference existed in GPA between athletes who participated in one sport and athletes who participated in three sports where the mean difference was 0.25557 GPA points. The implications for this analysis relating to the research questions are discussed in Chapter five. The results of the Tukey HSD test are represented in Table 7.

Table 7

Tukey HSD Post-Hoc Analysis for GPA in Class 3 and 4 Schools

(I) Sports	(J) Sports	Mean Difference (I-J)	SE	p
1	2	-.01615	.06836	.970
	3+	-.25557*	.10229	.034
2	3+	-.23942	.10822	.070

As shown in Figure 4, data reflect the average GPA by grade level for all schools reviewed in this research.

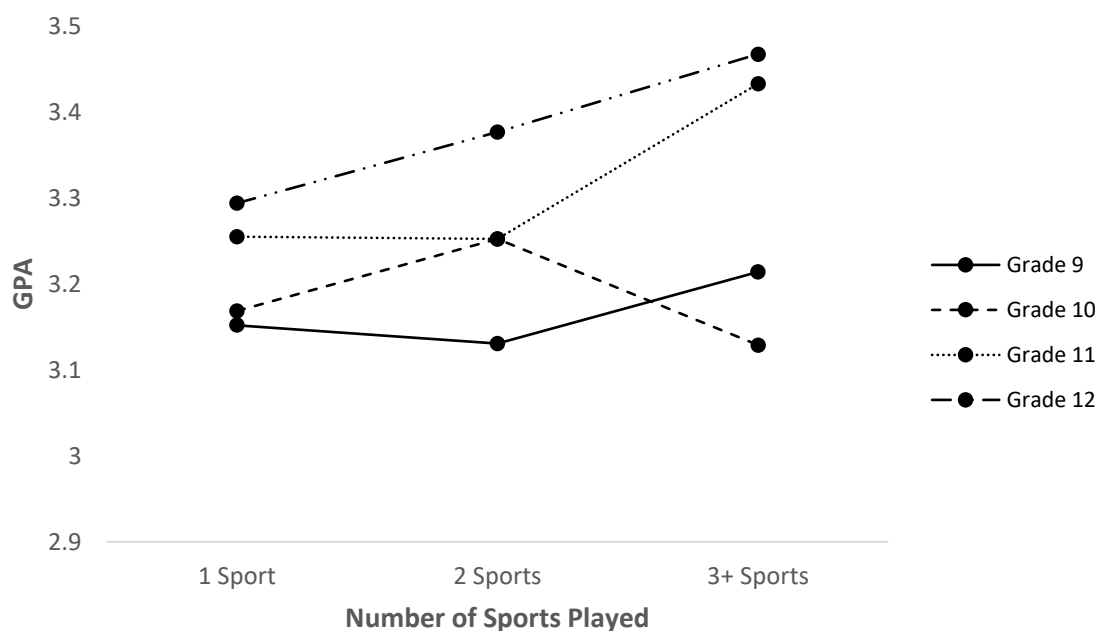


Figure 4. Average 2015-2016 GPA by grade level for all schools based upon number of sports played.

Freshman average student GPA slightly increased from 3.1520 to 3.1306 to 3.2139 as number of sports participated in increased respectively from one to two to three or more. Sophomore average student GPA slightly decreased from 3.1685 to 3.2523 to

3.1289 as number of sports participated in increased respectively from one to two to three or more. Junior average student GPA slightly increased from 3.2550 to 3.2523 to 3.4328 as number of sports participated in increased respectively from one to two to three or more. Senior average student GPA slightly increased from 3.2939 to 3.3765 to 3.4673 as number of sports participated in increased respectively from one to two to three or more. A summary of these data is represented in Table 8.

Table 8

Summary of One-Way ANOVA Data – Average 2015-2016 GPA by Grade Level from All Schools Based Upon Number of Sports Played

Sports	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	Minimum	Maximum
Freshman						
1	279	3.1520	.73090	.04376	.00	4.00
2	118	3.1306	.64808	.05966	1.45	4.00
3+	60	3.2139	.56878	.07343	1.75	4.00
Sophomore						
1	236	3.1685	.70642	.04598	.67	4.00
2	115	3.2523	.59789	.05575	1.59	4.00
3+	22	3.1289	.65450	.13954	1.86	3.99
Junior						
1	207	3.2550	.66164	.04599	1.18	4.00
2	102	3.2523	.65517	.06487	.73	4.00
3+	18	3.4328	.48362	.11399	1.83	4.00
Senior						
1	213	3.2939	.63259	.04334	1.15	4.00
2	81	3.3765	.54845	.06094	1.69	4.00
3+	16	3.4673	.26709	.06677	3.02	3.93

One-way ANOVA tests were performed to determine if significant differences existed in the data presented. The level of significance for this test was set at 95% with

an alpha level of 0.05. To determine statistical significance, the p -value was compared to the alpha level. For this data set, the freshman p -value ($p = 0.745$) was greater than the alpha level of 0.05; therefore, there were no statistically significant differences between the means. As a result, the null hypothesis was not rejected clarifying no significant difference in GPA for freshman athletes existed. For this data set, the sophomore p -value ($p = 0.495$) was greater than the alpha level of 0.05; therefore, there were no statistically significant differences between the means. As a result, the null hypothesis was not rejected clarifying no significant difference in GPA for sophomore athletes existed. For this data set, the junior p -value ($p = 0.528$) was greater than the alpha level of 0.05; therefore, there were no statistically significant differences between the means. As a result, the null hypothesis was not rejected clarifying no significant difference in GPA for junior athletes existed. For this data set, the senior p -value ($p = 0.355$) was greater than the alpha level of 0.05; therefore, there were no statistically significant differences between the means. As a result, the null hypothesis was not rejected clarifying no significant difference in GPA for senior athletes existed. The results of the ANOVA test are represented in Table 9.

Table 9

One-Way ANOVA for GPA by Grade Level for All Schools

	Sum of Squares	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Grade 9					
Between Groups	.281	2	.140	.294	.745
Within Groups	216.742	454	.477		
Total	217.022	456			
Grade 10					
Between Groups	.636	2	.318	.705	.495
Within Groups	167.020	370	.451		
Total	167.657	372			
Grade 11					
Between Groups	.544	2	.272	.640	.528
Within Groups	137.510	324	.424		
Total	138.054	326			
Grade 12					
Between Groups	.745	2	.372	1.039	.355
Within Groups	109.969	307	.358		
Total	110.713	309			

Note. Alpha level set at .05.

Analysis of Hours Absent

As shown in Figure 5, data reflect the average hours absent for all student athletes from all school sizes reviewed in this research.

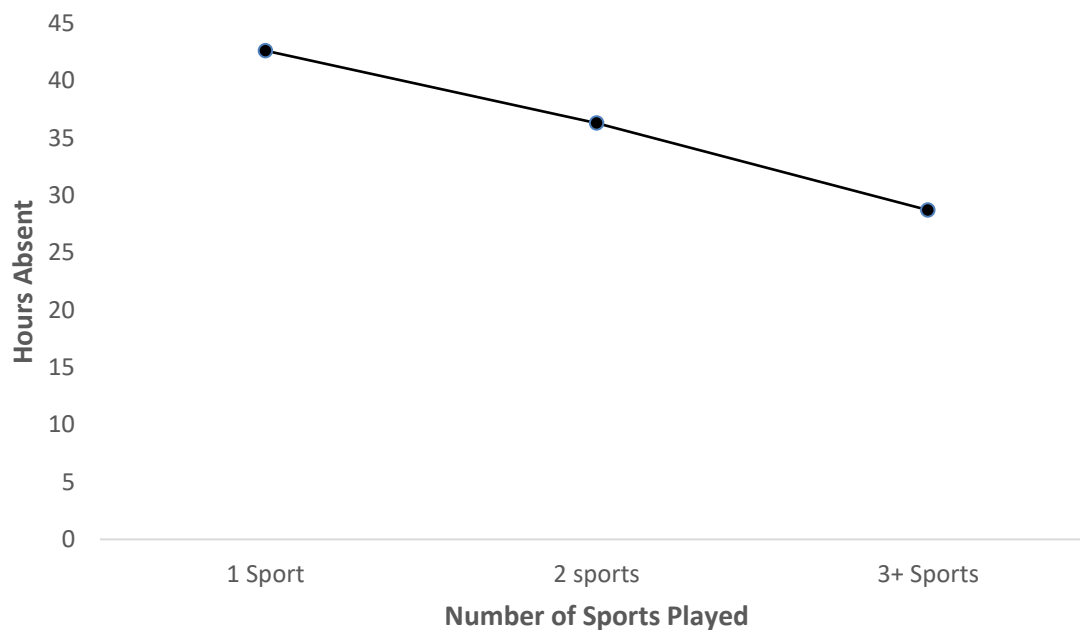


Figure 5. Average 2015-2016 hours absent for all athletes from all schools based upon number of sports played.

Student hours absent slightly decreased from 42.6376 to 36.3121 to 28.7282 as sport participation increased respectively from one to two to three or more sports. This data set includes all student athletes from all school sizes. A summary of these data is represented in Table 10.

Table 10

Summary of One-Way ANOVA Data – Average 2015-2016 Hours Absent for All Athletes from All Schools Based Upon Number of Sports Played

Sports	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	Minimum	Maximum
1	935	42.6376	47.36735	1.54908	.00	436.60
2	416	36.3121	37.08152	1.81807	.00	245.60
3+	116	28.7282	33.06560	3.07006	.00	190.80

A one-way ANOVA test was performed to determine if significant differences existed in the data presented. The level of significance for this test was set at 95% with an alpha level of 0.05. To determine statistical significance, the p -value was compared to the alpha level. For this data set, the p -value ($p = 0.001$) was less than the alpha level of 0.05; therefore, statistically significant differences between the means of each group existed. As a result, the researcher rejected the null hypothesis and accepted the alternate hypothesis that a significant difference in hours absent existed between the means. The result of the ANOVA test is represented in Table 11.

Table 11

One-Way ANOVA for Hours Absent for All Athletes from All Schools

	Sum of Squares	df	MS	F	p
Between Groups	26804.507	2	13402.254	7.028	.001
Within Groups	2791958.535	1464	1907.076		
Total	2818763.043	1466			

Note. Alpha level set at .05.

A post-hoc Tukey HSD test was then conducted to determine where significant difference existed between all athletes from all schools and their hours of absence. Results of the Tukey post-hoc analysis indicated a significant difference existed in hours of absence between athletes who participated in one sport and athletes who participated in two sports where the mean difference was 6.32548 hours and between athletes who participated in one sport and athletes who participated in three sports where the mean difference was 13.90936 hours. The implications for this analysis relating to the research

questions are discussed in Chapter Five. Table 12 includes the results of the post-hoc analysis.

Table 12

Tukey HSD for Hours Absent for All Athletes from All Schools

(I) Sports	(J) Sports	Mean Difference (I-J)	SE	p
1	2	6.32548*	2.57371	.037
	3+	13.90936*	4.29883	.004
2	3+	7.58388	4.58526	.224

Note. *The mean difference is significant at the 0.05 level.

As shown in Figure 6, data reflect the average hours absent by gender for student athletes from all school sizes reviewed in this research.

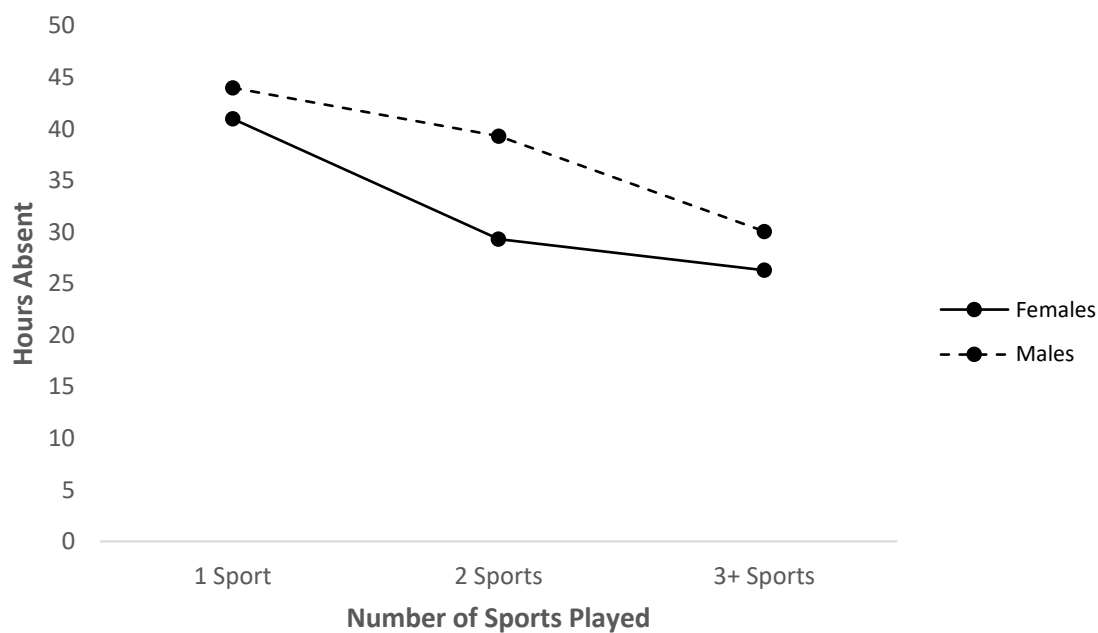


Figure 6. Average 2015-2016 hours absent by gender for athletes from all schools based upon number of sports played.

Female student hours absent slightly decreased from 40.9698 to 29.3044 to 26.2873 as sport participation increased respectively from one to two to three or more sports. Male student hours absent slightly decreased from 43.9743 to 39.2879 to 30.0625 as sport participation increased respectively from one to two to three or more sports. A summary of these data is represented in Table 13.

Table 13

Summary of One-Way ANOVA Data – Average 2015-2016 Hours Absent by Gender for Athletes from All Schools Based Upon Number of Sports Played

Sports	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	Minimum	Maximum
Female						
1	416	40.9698	48.31257	2.36872	.00	436.60
2	124	29.3044	28.72482	2.57956	.00	126.90
3+	41	26.2873	33.01486	5.15605	.00	190.80
Male						
1	519	43.9743	46.59955	2.04549	.00	303.80
2	292	39.2879	39.77932	2.32791	.00	245.60
3+	75	30.0625	33.23877	3.83808	.30	140.20

One-way ANOVA tests were performed to determine if significant differences existed in the data presented. The level of significance for this test was set at 95% with an alpha level of 0.05. To determine statistical significance, the *p*-value was compared to the alpha level. For this data set, the female *p*-value ($p = 0.009$) was less than the alpha level of 0.05; therefore, there were statistically significant differences between the means of each group. For this data set, the male *p*-value ($p = 0.023$) was less than the alpha level of 0.05; therefore, there were statistically significant differences between the means

of each group. As a result for both genders, the researcher rejected the null hypothesis and accepted the alternate hypothesis that a significant difference existed between the means. The results of the ANOVA tests are represented in Table 14.

Table 14

One-Way ANOVA for Hours Absent by Gender for All Schools

	Sum of Squares	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Female					
Between Groups	18490.238	2	9245.119	4.798	.009
Within Groups	1113741.677	578	1926.889		
Total	1132231.914	580			
Male					
Between Groups	14363.017	2	7181.508	3.804	.023
Within Groups	1667079.276	883	1887.972		
Total	1681442.292	885			

Note. Alpha level set at .05.

Post-hoc Tukey HSD tests were then conducted to determine where the significant differences existed for both female and male athletes. Results of the Tukey post-hoc analysis indicated a significant difference existed in hours of absence between female athletes who participated in one sport and female athletes who participated in two sports where the mean difference was 11.66545 hours. Results of the Tukey post-hoc analysis also indicated a significant difference existed in hours of absence between male athletes who participated in one sport and male athletes who participated in three sports where the mean difference was 13.91178 hours. The implications for this analysis relating to the research questions are discussed in Chapter Five. Table 15 includes the results of the post-hoc analysis.

Table 15

Tukey HSD by Gender for Hours Absent for All Schools

(I) Sports	(J) Sports	Mean Difference (I-J)	SE	p
Females				
1	2	11.66545*	4.49125	.026
	3+	14.68249	7.18535	.103
2	3+	3.01704	7.90802	.923
Males				
1	2	4.68637	3.17858	.304
	3+	13.91178*	5.36756	.026
2	3+	9.22541	5.62482	.229

Note. *The mean difference is significant at the 0.05 level.

As shown in Figure 7, data reflect the average hours absent by school size for all athletes reviewed in this research.

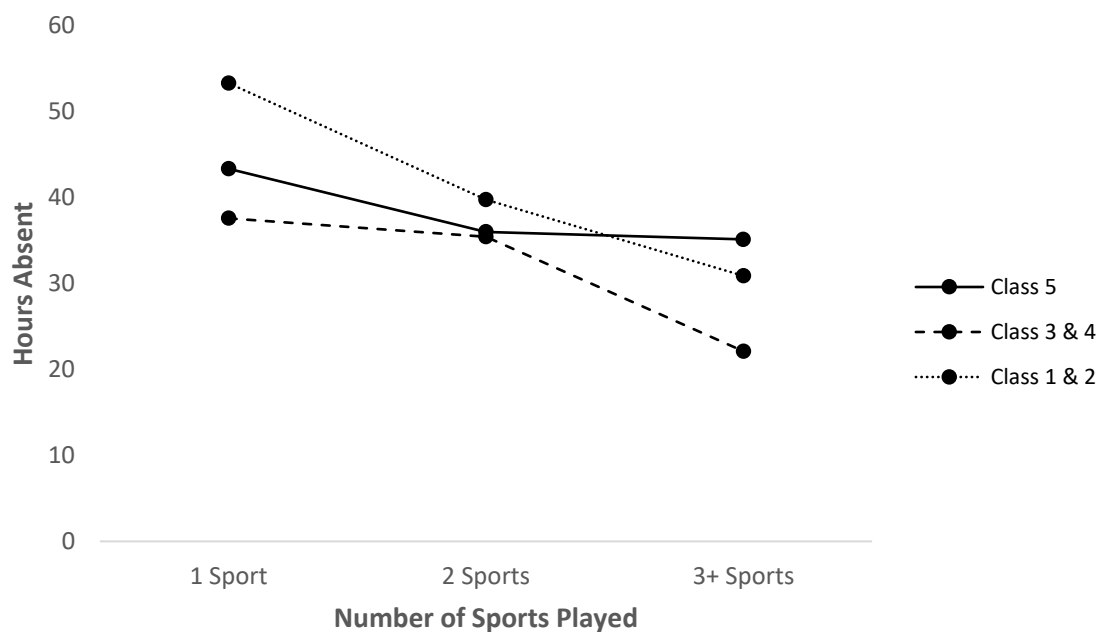


Figure 7. Average 2015-2016 hours absent by school classification for all athletes based upon number of sports played.

Class 5 student athlete hours absent slightly decreased from 43.3423 to 36.0074 to 35.1324 as sport participation increased respectively from one to two to three or more sports. Class 3 and 4 student athlete hours absent slightly decreased from 37.5762 to 35.4317 to 22.1149 as sport participation increased respectively from one to two to three or more sports. Class 1 and 2 student athlete hours absent slightly decreased from 53.3012 to 39.7722 to 30.8865 as sport participation increased respectively from one to two to three or more sports. A summary of these data is represented in Table 16.

Table 16

Summary of One-Way ANOVA Data – Average 2015-2016 Hours Absent by School Size for All Athletes Based Upon Number of Sports Played

Sports	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	Minimum	Maximum
Class 5						
1	638	43.3423	47.23815	1.87018	.00	366.20
2	229	36.0074	35.24485	2.32905	.00	195.60
3+	34	35.1324	37.77856	6.47897	.00	140.20
Class 3-4						
1	230	37.5762	42.78337	2.82105	.00	228.10
2	133	35.4317	42.54004	3.68869	.00	245.60
3+	45	22.1149	28.87599	4.30458	.00	117.50
Class 1-2						
1	67	53.3012	60.44802	7.38490	.00	436.60
2	54	39.7722	30.02340	4.08567	.00	112.10
3+	37	30.8865	32.66499	5.37009	.80	190.80
Total	158	43.4284	46.56484	3.70450	.00	436.60

One-way ANOVA tests were performed to determine if significant differences existed in the data presented. The level of significance for this test was set at 95% with an alpha level of 0.05. To determine statistical significance, the Class 5 *p*-value was

compared to the alpha level. For this data set, the p -value ($p = 0.071$) was greater than the alpha level of 0.05; therefore, there were no statistically significant differences between the means of each group. As a result, the null hypothesis was not rejected clarifying significant differences in hours of absence for athletes in Class 5 schools existed. To determine statistical significance, the Class 3 and 4 p -value was compared to the alpha level. For this data set, the p -value ($p = 0.074$) was greater than the alpha level of 0.05; therefore, there were no statistically significant differences between the means of each group. As a result, the null hypothesis was not rejected clarifying significant differences existed in hours of absence for athletes in Class 3 and 4 schools existed. To determine statistical significance, the Class 1 and 2 p -value was compared to the alpha level. For this data set, p -value ($p = 0.048$) was less than the alpha level of 0.05; therefore, there were statistically significant differences between the means of each group. The results of the ANOVA tests are represented in Table 17.

Table 17

One-Way ANOVA for Hours Absent by School Size for All Athletes

	Sum of Squares	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Class 5					
Between Groups	10353.463	2	5176.732	2.654	.071
Within Groups	1751749.069	898	1950.723		
Total	1762102.532	900			
Class 3-4					
Between Groups	9010.399	2	4505.199	2.626	.074
Within Groups	694728.001	405	1715.378		
Total	703738.400	407			
Class 1-2					
Between Groups	13072.565	2	6536.283	3.095	.048
Within Groups	327348.081	155	2111.923		
Total	340420.646	157			

Note. Alpha level set at .05.

A post-hoc Tukey HSD test was then conducted to determine where these significant differences existed in Class 1 and 2 athletes. Results of the Tukey post-hoc analysis indicated a significant difference existed in hours of absence between athletes who participated in one sport and athletes who participated in three or more sports where the mean difference was 22.41471 hours. The implications of this analysis relating to the research questions are discussed in Chapter Five. Table 18 includes the results of the post-hoc analysis.

Table 18

Tukey HSD for Hours Absent for All Athletes from Class 1 and 2 Schools

(I) Sports	(J) Sports	Mean Difference (I-J)	SE	p
1	2	13.52897	8.40422	.245
	3+	22.41471*	9.41277	.048
2	3+	8.88574	9.80758	.637

Note. *The mean difference is significant at the 0.05 level.

As shown in Figure 8, data reflect the average hours absent by grade level for all student athletes reviewed in this research.

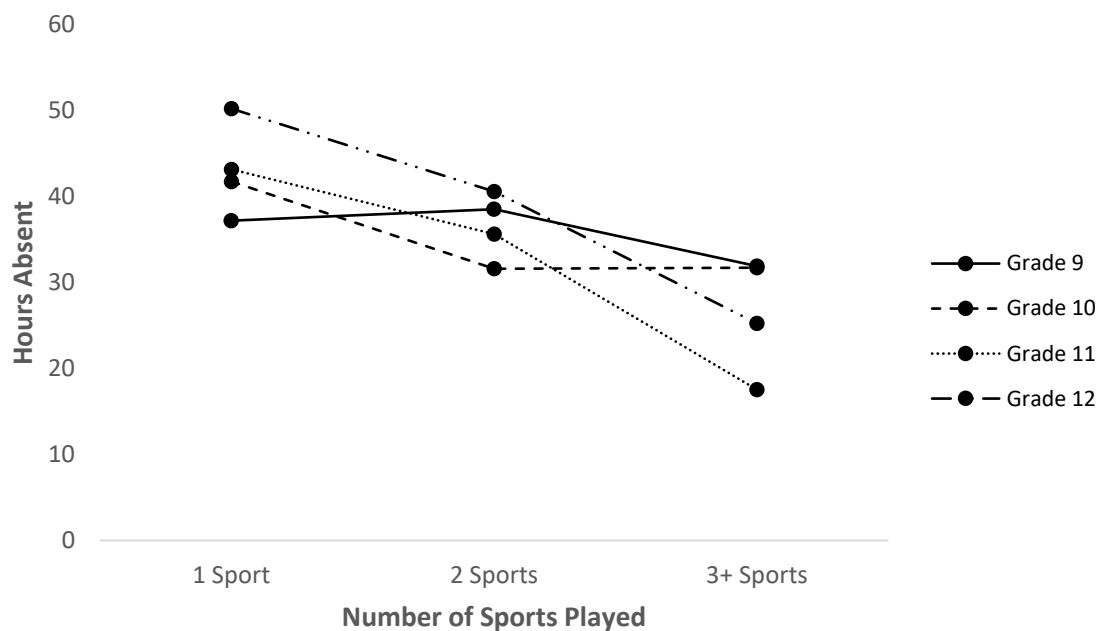


Figure 8. Average 2015-2016 hours absent by grade level for all schools based upon number of sports played.

Freshman student athlete hours absent slightly decreased from 37.1910 to 38.5295 to 31.9120 as sport participation increased respectively from one to two to three or more

sports. Sophomore student athlete hours absent slightly decreased from 41.7556 to 31.6083 to 31.7214 as sport participation increased respectively from one to two to three or more sports. Junior student athlete hours absent slightly decreased from 43.1681 to 35.6487 to 17.5456 as sport participation increased respectively from one to two to three or more sports. Senior student athlete hours absent slightly decreased from 50.2334 to 40.5952 to 25.2538 as sport participation increased respectively from one to two to three or more sports. A summary of these data is represented in Table 19.

Table 19

Summary of One-Way ANOVA Data – Average 2015-2016 Hours Absent by Grade Level for All Schools Based Upon Number of Sports Played

Sports	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	Minimum	Maximum
Grade 9						
1	279	37.1910	44.97287	2.69246	.00	366.20
2	118	38.5295	42.18566	3.88350	.00	245.60
3+	60	31.9120	36.00459	4.64817	.00	140.20
Grade 10						
1	236	41.7556	49.56932	3.22669	.00	436.60
2	115	31.6083	32.01371	2.98529	.00	195.60
3+	22	31.7214	41.41246	8.82917	.80	190.80
Grade 11						
1	207	43.1681	48.07788	3.34164	.00	297.90
2	102	35.6487	40.42117	4.00229	.00	232.10
3+	18	17.5456	16.34745	3.85313	.00	49.40
Grade 12						
1	213	50.2334	46.52636	3.18793	.00	217.20
2	81	40.5952	30.80423	3.42269	.00	120.20
3+	16	25.2538	19.04850	4.76212	1.73	52.20

One-way ANOVA tests were performed to determine if significant differences existed in the data presented. The level of significance for this test was set at 95% with an alpha level of 0.05. To determine statistical significance, the freshman p -value was compared to the alpha level. For this data set, the p -value ($p = 0.613$) was greater than the alpha level of 0.05; therefore, there were no statistically significant differences between the means of each group. To determine statistical significance, the sophomore p -value was compared to the alpha level. For this data set, the p -value ($p = 0.107$) was greater than the alpha level of 0.05; therefore, there were no statistically significant differences between the means of each group. As a result, the null hypothesis was not rejected clarifying no significant differences in hours of absence for both freshman and sophomore athletes existed. To determine statistical significance, the junior p -value was compared to the alpha level. For this data set, the p -value ($p = 0.040$) was less than the alpha level of 0.05; therefore, there were statistically significant differences between the means of each group. To determine statistical significance, the senior p -value was compared to the alpha level. For this data set, the p -value ($p = 0.026$) was less than the alpha level of 0.05; therefore, there were statistically significant differences between the means of each group. As a result, the researcher rejected the null hypothesis and accepted the alternate hypothesis that significant differences existed between the means of hours absent for both junior and senior athletes. The results of the ANOVA test are represented in Table 20.

Table 20

One-Way ANOVA for Hours Absent by Grade Level for All Schools

	Sum of Squares	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Grade 9					
Between Groups	1828.296	2	914.148	.490	.613
Within Groups	846971.527	454	1865.576		
Total	848799.823	456			
Grade 10					
Between Groups	8893.507	2	4446.754	2.253	.107
Within Groups	730273.537	370	1973.712		
Total	739167.044	372			
Grade 11					
Between Groups	12971.533	2	6485.767	3.254	.040
Within Groups	645729.460	324	1992.992		
Total	658700.993	326			
Grade 12					
Between Groups	13013.776	2	6506.888	3.697	.026
Within Groups	540271.489	307	1759.842		
Total	553285.265	309			

Note. Alpha level set at .05.

Post-hoc Tukey HSD tests were then conducted to determine where these significant differences in junior and senior athletes existed. Results of the Tukey post-hoc analysis were unable to indicate with 95% certainty where the significant difference existed in hours of absence between junior and senior athletes who participated in one sport, junior and senior athletes who participated in two sports, and junior and senior athletes who participated in three or more sports. Although the ANOVA test results allowed the researcher to reject the null hypothesis that no significant difference existed in hours of absence, the Tukey HSD test was unable to clarify through pairwise comparison at 95% certainty where exactly the difference existed. The implications for

this analysis relating to the research questions are discussed in Chapter Five. Table 21 includes the results of the post-hoc analysis.

Table 21

Tukey HSD for Hours Absent for Junior and Senior Athletes from All Schools

(I) Sports	(J) Sports	Mean Difference (I-J)	SE	p
Grade 11				
1	2	7.51939	5.40066	.346
	3+	25.62256	10.97040	.052
2	3+	18.10317	11.41319	.253
Grade 12				
1	2	9.63820	5.47619	.185
	3+	24.97963	10.87439	.058
2	3+	15.34144	11.47678	.376

Analysis of Days Suspended

As shown in Figure 9, data reflect the average days suspended for all student athletes from all schools reviewed in this research.

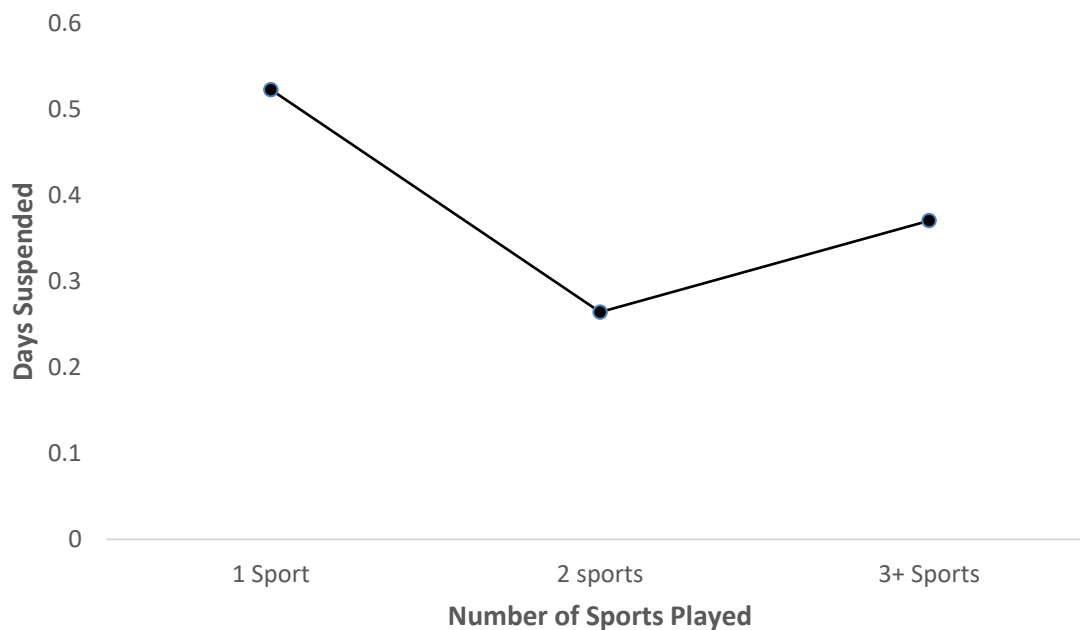


Figure 9. Average 2015-2016 days suspended for all athletes from all schools based upon number of sports played.

Student athlete days suspended slightly decreased from 0.5230 to 0.2644 to 0.3707 as sport participation increased respectively from one to two to three or more sports. This data set includes all student athletes from all school sizes. A summary of these data is represented in Table 22.

Table 22

Summary of One-Way ANOVA Data – Average 2015-2016 Days Suspended for All Athletes from All Schools Based Upon Number of Sports Played

Sports	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	Minimum	Maximum
1	935	.5230	1.89252	.06189	.00	23.00
2	416	.2644	1.16051	.05690	.00	13.00
3+	116	.3707	1.13850	.10571	.00	7.00

A one-way ANOVA test was performed to determine if significant differences existed in the data presented. The level of significance for this test was set at 95% with an alpha level of 0.05. To determine statistical significance, the p -value was compared to the alpha level. For this data set, the p -value ($p = 0.028$) was less than the alpha level of 0.05; therefore, there were statistically significant differences between the means of each group. As a result, the researcher rejected the null hypothesis and accepted the alternate hypothesis that a significant difference in days suspended existed between the means. The results of the ANOVA test are represented in Table 23.

Table 23

One-Way ANOVA for Days Suspended for All Athletes from All Schools

	Sum of Squares	df	MS	F	p
Between Groups	19.814	2	9.907	3.578	.028
Within Groups	4053.229	1464	2.769		
Total	4073.043	1466			

Note. Alpha level set at .05.

A post-hoc Tukey HSD test was then conducted to determine where these significant differences existed. Results of the Tukey post-hoc analysis indicated a significant difference in days suspended existed between athletes who participated in one sport and athletes who participated in two sports where the mean difference was 0.25857 days. The implications for this analysis relating to the research questions are discussed in Chapter Five. Table 24 includes the results of the post-hoc analysis.

Table 24

Tukey HSD for Days Suspended for All Athletes from All Schools

(I) Sports	(J) Sports	Mean Difference (I-J)	SE	p
1	2	.25857*	.09806	.023
	3+	.15230	.16379	.621
2	3+	-.10627	.17471	.816

Note. *The mean difference is significant at the 0.05 level.

As shown in Figure 10, data reflect the average days suspended based on gender for student athletes from all schools reviewed in this research.

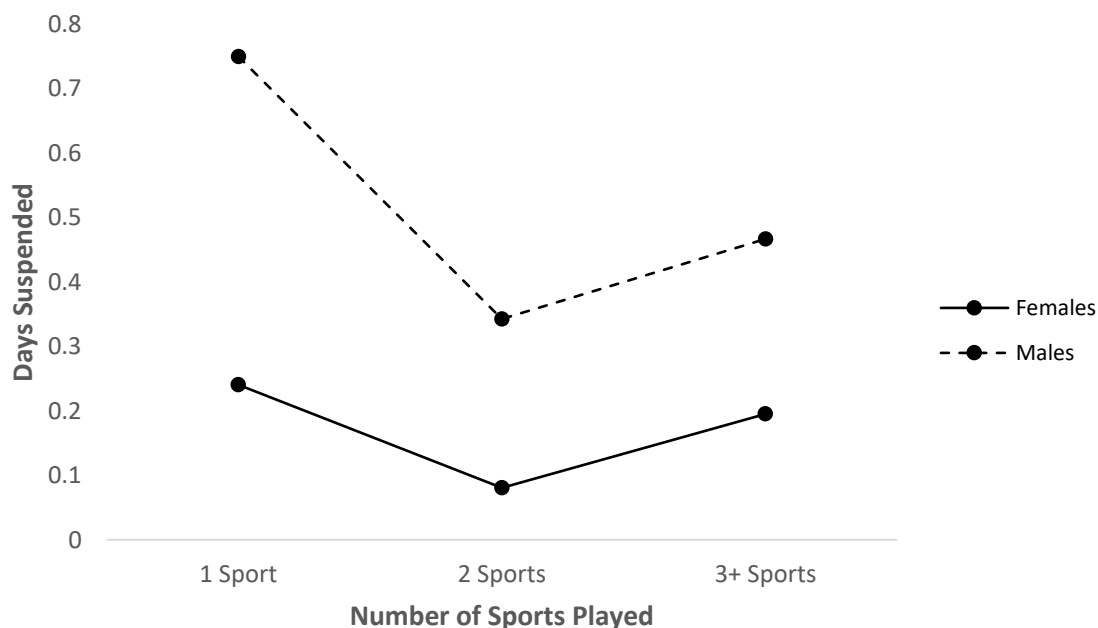


Figure 10. Average 2015-2016 days suspended by gender for athletes from all schools based upon number of sports played.

Female student athlete days suspended slightly decreased from 0.2404 to 0.0806 to 0.1951 as sport participation increased respectively from one to two to three or more

sports. Male student athlete days suspended slightly decreased from 0.7495 to 0.3425 to 0.4667 as sport participation increased respectively from one to two to three or more sports. A summary of these data is represented in Table 25.

Table 25

Summary of One-Way ANOVA Data – Average 2015-2016 Days Suspended by Gender for All Athletes from All Schools Based Upon Number of Sports Played

Sports	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	Minimum	Maximum
Female						
1	416	.2404	1.14488	.05613	.00	11.00
2	124	.0806	.50359	.04522	.00	5.00
3+	41	.1951	.84319	.13168	.00	5.00
Male						
1	519	.7495	2.30051	.10098	.00	23.00
2	292	.3425	1.33902	.07836	.00	13.00
3+	75	.4667	1.26633	.14622	.00	7.00

One-way ANOVA tests were performed to determine if significant differences existed in the data presented. The level of significance for this test was set at 95% with an alpha level of 0.05. To determine statistical significance, the female *p*-value was compared to the alpha level. For this data set, the *p*-value ($p = 0.312$) was greater than the alpha level of 0.05; therefore, there were no statistically significant differences between the means of each group. As a result, the null hypothesis was not rejected clarifying no significant differences between means in days suspended for female athletes existed. To determine statistical significance, the male *p*-value was compared to the alpha level. For this data set, the *p*-value ($p = 0.015$) was less than the alpha level of

0.05; therefore, there were statistically significant differences between the means of each group. The results of the ANOVA test are represented in Table 26.

Table 26

One-Way ANOVA for Days Suspended by Gender for Athletes from All Schools

	Sum of Squares	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Female					
Between Groups	2.440	2	1.220	1.168	.312
Within Groups	603.594	578	1.044		
Total	606.034	580			
Male					
Between Groups	32.237	2	16.119	4.209	.015
Within Groups	3381.857	883	3.830		
Total	3414.095	885			

Note. Alpha level set at .05.

A post-hoc Tukey HSD test was then conducted to determine where these significant differences existed. Results of the Tukey post-hoc analysis indicated a significant difference in days suspended existed between male athletes who participated in one sport and male athletes who participated in two sports where the mean difference was 0.40705 days. The implications for this analysis relating to the research questions are discussed in Chapter Five. Table 27 includes the results of the post-hoc analysis.

Table 27

Tukey HSD for Days Suspended for Male Athletes from All Schools

(I) Sports	(J) Sports	Mean Difference (I-J)	SE	p
1	2	.40705*	.14316	.013
	3+	.28285	.24176	.471
2	3+	-.12420	.25334	.876

Note. *The mean difference is significant at the 0.05 level.

As shown in Figure 11, data reflect the average days suspended based on school classification for all student athletes reviewed in this research.

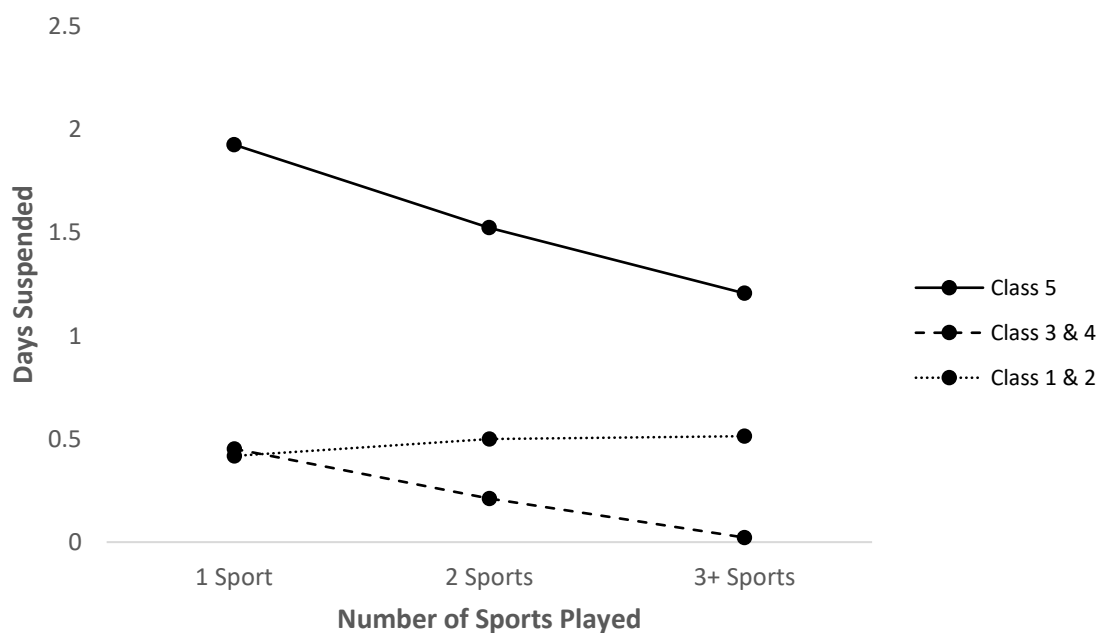


Figure 11. Average 2015-2016 days suspended by school classification for all athletes based upon number of sports played.

Class 5 student athlete days suspended slightly decreased from 1.9263 to 1.5240 to 1.2059 as sport participation increased respectively from one to two to three or more sports. Class 3 and 4 student athlete days suspended slightly decreased from 0.4522 to 0.2105 to 0.0222 as sport participation increased respectively from one to two to three or more sports. Class 1 and 2 student athlete days suspended slightly increased from 0.4179 to 0.5000 to 0.5135 as sport participation increased respectively from one to two to three or more sports. A summary of these data is represented in Table 28.

Table 28

Summary of One-Way ANOVA Data – Average 2015-2016 Days Suspended by School Classification for All Athletes Based Upon Number of Sports Played

Sports	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	Minimum	Maximum
Class 5						
1	638	1.9263	3.18245	.12599	.00	23.00
2	229	1.5240	2.70568	.17880	.00	14.00
3+	34	1.2059	1.87131	.32093	.00	8.00
Class 3-4						
1	230	.4522	1.25898	.08301	.00	8.00
2	133	.2105	.76922	.06670	.00	5.00
3+	45	.0222	.14907	.02222	.00	1.00
Class 1-2						
1	67	.4179	1.41581	.17297	.00	10.00
2	54	.5000	1.67951	.22855	.00	10.00
3+	37	.5135	1.38688	.22800	.00	6.00

One-way ANOVA tests were performed to determine if significant differences existed in the data presented. The level of significance for this test was set at 95% with an alpha level of 0.05. In order to determine statistical significance, the Class 5 *p*-value was compared to the alpha level. For this data set, the *p*-value ($p = 0.116$) was greater

than the alpha level of 0.05; therefore, there were no statistically significant differences between the means of each group. As a result, the null hypothesis was not rejected clarifying that no significant differences in days suspended for Class 5 athletes existed. In order to determine statistical significance, the Class 3 and 4 p -value was compared to the alpha level. For this data set, the p -value ($p = 0.013$) was less than the alpha level of 0.05; therefore, there were statistically significant differences between the means of each group. As a result, the researcher rejected the null hypothesis and accepted the alternative hypothesis that significant differences between means existed. Finally, in order to determine statistical significance, the Class 1 and 2 p -value was compared to the alpha level. For this data set, the p -value ($p = 0.936$) was greater than the alpha level of 0.05; therefore, there were no statistically significant differences between the means of each group. As a result, the null hypothesis was not rejected clarifying that no significant differences in days suspended for Class 1 and 2 athletes existed. The results of the ANOVA tests are represented in Table 29.

Table 29

One-Way ANOVA for Days Suspended for All Athletes from All Schools

	Sum of Squares	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Class 5					
Between Groups	39.617	2	19.808	2.160	.116
Within Groups	8236.214	898	9.172		
Total	8275.831	900			
Class 3-4					
Between Groups	9.588	2	4.794	4.392	.013
Within Groups	442.057	405	1.091		
Total	451.645	407			
Class 1-2					
Between Groups	.300	2	.150	.066	.936
Within Groups	351.042	155	2.265		
Total	351.342	157			

Note. Alpha level set at .05.

A post-hoc Tukey HSD test was then conducted to determine where these significant differences existed in Class 3 and 4 athletes. Results of the Tukey post-hoc analysis indicated a significant difference in days suspended existed between athletes who participated in one sport and athletes who participated in three sports where the mean difference was 0.42995 days. The implications for this analysis relating to the research questions are discussed in Chapter Five. Table 30 includes the results of the post-hoc analysis.

Table 30

Tukey HSD for Days Suspended for All Athletes From Class 3 and 4 Schools

(I) Sports	(J) Sports	Mean Difference (I-J)	SE	p
1	2	.24165	.11381	.086
	3+	.42995*	.17030	.032
2	3+	.18830	.18017	.549

Note. *The mean difference is significant at the 0.05 level.

As shown in Figure 12, data reflect the average days suspended by grade level for student athletes from all schools reviewed in this research.

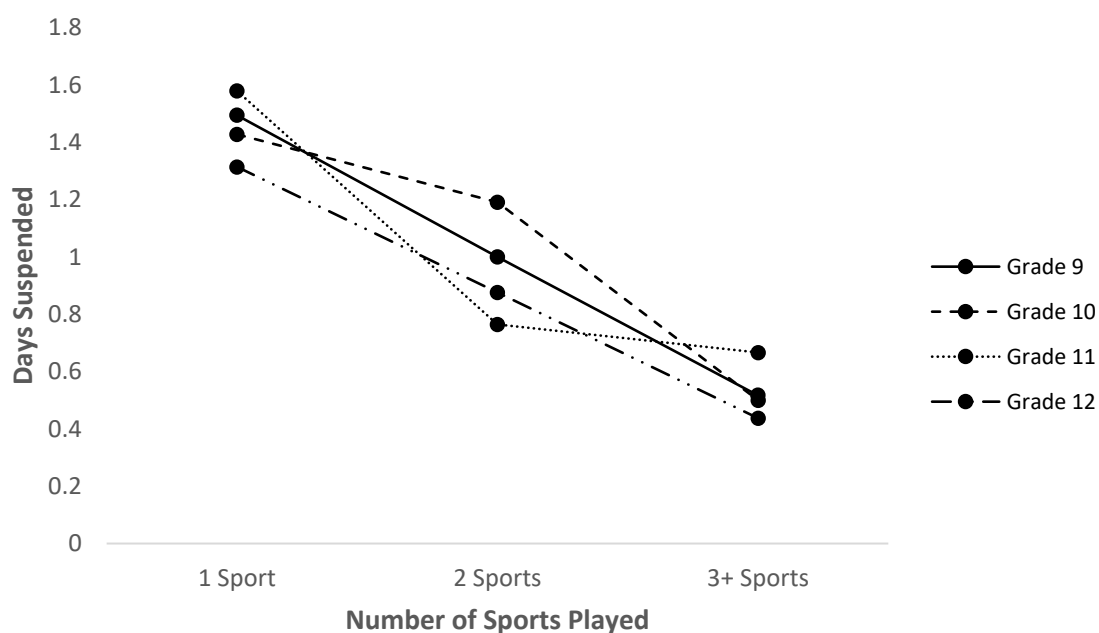


Figure 12. Average 2015-2016 days suspended by grade level for all schools based upon number of sports played.

Freshman student athlete days suspended slightly decreased from 1.4946 to 1.0000 to 0.5167 as sport participation increased respectively from one to two to three or

more sports. Sophomore student athlete days suspended slightly decreased from 1.4280 to 1.1913 to 0.5000 as sport participation increased respectively from one to two to three or more sports. Junior student athlete days suspended slightly decreased from 1.5797 to 0.7647 to 0.6667 as sport participation increased respectively from one to two to three or more sports. Senior student athlete days suspended slightly decreased from 1.3146 to 0.8765 to 0.4375 as sport participation increased respectively from one to two to three or more sports. A summary of these data is represented in Table 31.

Table 31

Summary of One-Way ANOVA Data – Average 2015-2016 Days Suspended by Grade Level for Athletes from All Schools Based Upon Number of Sports Played

Sports	<i>n</i>	<i>M</i>	<i>SD</i>	<i>SE</i>	Minimum	Maximum
Grade 9						
1	279	1.4946	2.79886	.16756	.00	20.00
2	118	1.0000	1.96551	.18094	.00	11.00
3+	60	.5167	1.22808	.15855	.00	7.00
Grade 10						
1	236	1.4280	2.60913	.16984	.00	14.00
2	115	1.1913	2.93466	.27366	.00	14.00
3+	22	.5000	1.18523	.25269	.00	5.00
Grade 11						
1	207	1.5797	3.01166	.20932	.00	14.00
2	102	.7647	1.58068	.15651	.00	11.00
3+	18	.6667	1.87867	.44281	.00	8.00
Grade 12						
1	213	1.3146	2.86317	.19618	.00	23.00
2	81	.8765	2.11768	.23530	.00	11.00
3+	16	.4375	1.50416	.37604	.00	6.00

One-way ANOVA tests were performed to determine if significant differences existed in the data presented in Table 31. The level of significance for this test was set at 95% with an alpha level of 0.05. To determine statistical significance, the freshman p -value was compared to the alpha level. For this data set, the p -value ($p = 0.010$) was less than the alpha level of 0.05; therefore, there were statistically significant differences between the means of each group. As a result, the researcher rejected the null hypothesis and accepted the alternate hypothesis that a significant difference existed between the means in days suspended. To determine statistical significance, the sophomore p -value was compared to the alpha level. For this data set, the p -value ($p = 0.256$) was greater than the alpha level of 0.05; therefore, there were no statistically significant differences between the means of each group. As a result, the null hypothesis was not rejected clarifying no significant difference existed in days suspended in sophomore athletes existed. To determine statistical significance, the junior p -value was compared to the alpha level. For this data set, the p -value ($p = 0.021$) was less than the alpha level of 0.05; therefore, there were statistically significant differences between the means of each group. As a result, the researcher rejected the null hypothesis and accepted the alternate hypothesis that a significant difference existed between the means in days suspended. To determine statistical significance, the senior p -value was compared to the alpha level. For this data set, the p -value ($p = 0.239$) was greater than the alpha level of 0.05; therefore, there were no statistically significant differences between the means of each group. As a result, the null hypothesis was not rejected clarifying no significant difference in days suspended in senior athletes existed. The results of the ANOVA tests are represented in Table 32.

Table 32

One-Way ANOVA for Days Suspended by Grade Level for Athletes from All Schools

	Sum of Squares	<i>df</i>	<i>MS</i>	<i>F</i>	<i>p</i>
Grade 9					
Between Groups	56.277	2	28.138	4.699	.010
Within Groups	2718.725	454	5.988		
Total	2775.002	456			
Grade 10					
Between Groups	19.303	2	9.652	1.368	.256
Within Groups	2611.067	370	7.057		
Total	2630.370	372			
Grade 11					
Between Groups	52.442	2	26.221	3.896	.021
Within Groups	2180.788	324	6.731		
Total	2233.229	326			
Grade 12					
Between Groups	19.940	2	9.970	1.437	.239
Within Groups	2130.628	307	6.940		
Total	2150.568	309			

Note. Alpha level set at .05.

Post-hoc Tukey HSD tests were then conducted to determine where these significant differences in freshman and junior athletes existed. Results of the Tukey post-hoc analysis indicated a significant difference in days suspended for freshman athletes existed between athletes who participated in one sport and athletes who participated in three sports where the mean difference was 0.97796 days. Results of the Tukey post-hoc analysis also indicated a significant difference in days suspended for junior athletes existed between athletes who participated in one sport and athletes who participated in two sports where the mean difference was 0.81500 days. The implications for this

analysis relating to the research questions are discussed in Chapter Five. Table 33 includes the results of the post-hoc analysis.

Table 33

Tukey HSD for Days Suspended for Freshman and Junior Athletes from All Schools

(I) Sports	(J) Sports	Mean Difference (I-J)	SE	p
Freshman				
1	2	.49462	.26872	.158
	3+	.97796*	.34824	.014
2	3+	.48333	.38801	.427
Junior				
1	2	.81500*	.31385	.027
	3+	.91304	.63753	.326
2	3+	.09804	.66327	.988

Note. *The mean difference is significant at the 0.05 level.

Summary

Mark Rerick (2016) of the National Federation of High Schools suggested there are many benefits to multiple-sport participation. With an estimated half of all sports injuries attributed to overuse and sport specialization one of the biggest factors contributing to that overuse (Andrews & Yaeger, 2013), it is imperative to investigate all aspects of student life to help students and families make informed decisions when considering athletic participation.

This research was designed to clarify if there were significant differences in GPAs, days absent, and days suspended in approximately 1,500 student athletes during the 2015-2016 school year from six high schools of varying size in southwest Missouri.

After collecting GPAs, days absent, and days suspended for student athletes from participating high schools, an ANOVA test was conducted to determine if significant differences existed among students who participated in one sport, two sports, and three or more sports. If the ANOVA test determined a significant difference indeed existed, a Tukey HSD test was performed to clarify where exactly the significant differences existed.

In Chapter Five, the findings from the data presented in this chapter relating to the research questions are presented. A discussion of the limitations of findings regarding this research and conclusions are presented. Implications for practice are discussed, and recommendations for future research are posed.

Chapter Five: Summary and Conclusions

Sport specialization in student athletes is becoming an area of focus for many stakeholders in the realm of high school sports (Rerick, 2016). While there can be benefits for some student athletes to specialize in a single sport, there are also concerns for injury and burnout if not done properly (Brenner, 2016). One of the greatest sources of overuse injury in athletes comes from the practice of sport specialization (Andrews & Yaeger, 2013).

The purpose of this quantitative study was to clarify any significant differences in GPAs, attendance, and suspensions in high school student athletes who participate in one sport and those who participate in multiple sports. Sport specialization is not a new concept; however, measuring academic and behavioral differences in student athletes based on the number of sports they play is rarely documented in research. In Chapter Five, the research questions are revisited and answered. Findings from the research are presented. Additionally, conclusions, implications for practice, and recommendations for future research are provided.

Findings

This quantitative study was designed to clarify if significant differences existed in academic and behavioral performance of students who play one sport and students who play multiple sports by analyzing GPAs, hours absent, and days suspended for approximately 1,500 student athletes in southwest Missouri. A literature review was provided in Chapter Two to afford further reference to the findings of this study. Data were collected for this research from all student athletes from six high schools in

southwest Missouri that varied in size to represent most high school enrollment sizes in the state. Analyses were then performed to answer three research questions.

Research question one. What is the difference, if any, in annual GPA for high school athletes who compete in one sport and high school athletes who compete in multiple sports?

Although average GPAs typically increased as sport participation increased, ANOVA tests indicated there were no significant differences in GPA between single-sport athletes and multiple-sport athlete in all cases except one. The one case where a significant difference in GPA did occur was GPA for all student athletes from Class 3 and 4 schools, where student GPA increased from 3.1329 to 3.1490 to 3.3884 as number of sports increased respectively from one to two to three or more. In this particular instance, the significant difference was between one-sport athletes and three-sport athletes. As a result, the researcher rejected the null hypothesis that no significant difference existed and accepted the alternate hypothesis that a significant difference existed. The significant difference in GPA existed between one- and three-sport athletes in Class 3 and 4 schools where the three-sport athletes had significantly increased GPAs over one-sport athletes with a mean difference of 0.25557 GPA points. A summary of these findings is included in Table 34.

As noted by Shomper (2011), school activities such as athletics promote increased academic performance for participants. In addition to the suggestions of Myer et. al (2015) that indicate multiple sport participation is good for skill development in children (p. 70), the findings for this research question indicate in certain situations there may be academic benefits to multiple sport participation as well.

Research question two. What is the difference, if any, in annual hours absent for high school athletes who compete in one sport and high school athletes who compete in multiple sports?

In all cases but one, the mean average of hours absent for multiple-sport athletes was lower than for single-sport athletes. As a result of ANOVA tests, significant differences were determined to exist in six of 10 categories as follows: all athletes all schools, female athletes all schools, male athletes all schools, all athletes Class 1 and 2 schools, all junior athletes, and all senior athletes. As a result of this analysis, the researcher rejected the null hypothesis and accepted the alternate hypothesis that a significant difference in hours absent existed between students who participated in one sport and students who participated in multiple sports.

For all athletes in all schools, the significant difference existed between one- and two- and one- and three-sport athletes with mean differences of 6.32548 and 13.90936 hours, respectively. For female athletes, the significant difference existed between one- and two-sport athletes with a mean difference of 11.66545 hours absent. For male athletes, the significant difference existed between one- and three-sport athletes with a mean difference of 13.91178 hours absent.

For Class 1 and 2 athletes, the significant difference existed between one- and three-sport athletes with a mean difference of 22.41471 hours absent. For both junior and senior athletes, the Tukey HSD was unable to indicate where the significant differences in hours of absence existed. In all cases, the multiple-sport athletes had a lower incidence of absence than the single-sport athletes. A summary of these findings is included in Table 34. As noted by Shomper (2011), students who participate in school activities have

improved attendance rates. Furthermore, as Brenner (2016) noted that overuse injuries have increased due to sport specialization, the findings relating to this research question indicate that in certain situations there may be improved behavioral performance in our student athletes who participate in multiple sports.

Research question three. What is the difference, if any, in annual days suspended for high school athletes who compete in one sport and high school athletes who compete in multiple sports?

In all cases but one, the mean average of days suspended for multiple-sport athletes was lower than for single-sport athletes. As a result of the ANOVA tests, significant differences were determined to exist in five of 10 categories as follows: all athletes all schools, male athletes all schools, all athletes Class 3 and 4 schools, all freshman athletes, and all junior athletes. As a result of this analysis, the researcher rejected the null hypothesis and accepted the alternate hypothesis that a significant difference in hours absent existed between students who participated in one sport and students who participated in multiple sports.

For all athletes in all schools, the significant difference existed between one- and two-sport athletes with a mean difference of 0.25857 days suspended. For male athletes, the significant difference existed between one- and two-sport athletes with a mean difference of 0.40705 days suspended. For Class 3 and 4 athletes, the significant difference existed between one- and three-sport athletes with a mean difference of 0.42995 days suspended. For freshman athletes, the significant difference existed between one- and three-sport athletes with a mean difference of 0.97796 days suspended.

For junior athletes, the significant difference existed between one- and two-sport

athletes with a mean difference of 0.81500 days suspended. In all cases, the multiple-sport athletes had a lower incidence of suspension than the single-sport athletes. A summary of these findings is included in Table 34. As Shomper (2011) noted, activities help promote the academic mission of schools, and reduced discipline supports that idea. With sport specialization significantly contributing to overuse injury (Andrews & Yaeger, 2013), the findings of this research indicated that in certain situations it may be in the best interest of the child both academically and behaviorally to participate in multiple sports.

Table 34

Summary of Significant Differences for All Areas Analyzed Among One-, Two-, and Three-or-More Sport Athletes

	GPA	Hours Absent		Days Suspended
All Students	None	1-2 6.32548	1-3+ 13.90936	1-2 0.25857
Females	None	1-2 11.66545		None
Males	None	1-3+ 13.91178		1-2 0.40705
Class 5	None	None		None
Class 3 & 4	1-3+ 0.25557	None		1-3+ 0.42995
Class 1 & 2	None	1-3+ 22.41471		None
Freshmen	None	None		1-3+ 0.97796
Sophomores	None	None		None
Juniors	None	Unclear		1-2 0.81500
Seniors	None	Unclear		None

Note. In all cases of significant difference, the multiple-sport athletes had the preferred data.

Conclusions

Many reasons that may discourage sport specialization were discussed in Chapter Two's review of literature, burnout and injury to name two. This research supports many of the studies reviewed in Chapter Two that promote multiple-sport participation by providing additional evidence about the potential benefits of multiple-sport participation. In addition to improved physical and psychological health, this research indicates there

may additionally be academic benefits to student athletes with multiple-sport participation. It is the conclusion of this researcher that only positive outcomes relating to GPA, attendance, and suspension regarding multiple-sport participation exist.

After a thorough review of MSHSAA (2016) by-laws concerning student athlete eligibility for participation, it is clear why improved attendance rates are a result of multiple-sport participation. The MSHSAA (2016) by-law 2.2.3 Section D states if a student misses class without being excused by the principal, the student shall not be considered eligible on that date. Further, the student cannot be certified eligible to participate on any subsequent date until the student attends a full day of classes (MSHSAA, 2016). It can be concluded the more a student is involved in athletic activities, the more likely the student will attend school in order to be eligible to participate in events (MSHSAA, 2016).

Additionally, MSHSAA (2016) by-laws concerning student athlete eligibility for participation, it is also clear why improved suspension rates are a result of multiple-sport participation. The MSHSAA (2016) by-law 2.2.3 Section B states the eligibility of a student who is serving detention or in-school suspension shall be determined by local school authorities, and Section C states a student shall not be considered eligible while serving an out-of-school suspension. Furthermore, Section E states each individual school has the authority to set more restrictive citizenship standards and shall have the authority and responsibility to judge its students under those standards (MSHSAA, 2016). It can be concluded the more sports a student participates in, the less likely he or she will behave in a way that would result in a suspension in order to remain eligible to participate.

Finally, MSHSAA (2016) by-laws concerning student athlete eligibility for participation, it is clear improved GPAs are another benefit of multiple-sport participation. The MSHSAA (2016) by-law 2.3.2 Section A states in the semester prior to participation, the student shall have earned, during the preceding semester of attendance, a minimum of 3.0 units of credit or credit in 80% of the maximum allowable classes in which a student can be enrolled, whichever is greater. Although this by-law only requires a minimum passing score to be considered eligible to participate, it still imposes an academic guideline to promote improved academic performance (MSHSAA, 2016). It can be concluded the more sports a student participates in, the more likely they will be to have improved academic performance as a result of MSHSAA (2016) by-laws.

It is clear that athletic participation can have academic benefits including increased collegiate attendance (Martin, 2015). What is becoming clearer is that not only are there inherent health benefits to multiple sport participation (Balyi, Way & Higgs, 2013) there may be inherent academic benefits as well. As indicated by Rerick (2016) the benefits of multi-sport participation are clear for the 93% of student athletes who will not play beyond high school

Implications for Practice

The primary implication for practice indicated by this research is to encourage students to be involved in multiple sports. Participation should be encouraged throughout the high school experience by teachers, administrators, coaches, and parents. This approach should be two-fold. First, athletes should be encouraged to participate on multiple teams throughout their high school experience. This is often not the case, as pressures to specialize influence student decisions. Chapter Two contained further

insights into the pressures to specialize faced by student athletes. Since there were no significant differences between 2 and 3 or more sport athletes, adults in the lives of students athletes should not concern themselves with participating in every sport possible, rather that the student athlete participates in more than one sport.

Second, as a general guideline leaders of athletic departments should discourage their coaching staff from pressuring student athletes to focus on the one particular sport that coach leads. As noted in chapter 2, pressures to specialize come in many shapes and forms. The coaching staff of high school student athletes, having direct contact and persuasion in the decision making of students athletes, should be highly sensitive to these pressures. As this research has shown, it is in the interest of the student athlete to participate in multiple sports and coaches who encourage students to focus on their one particular sport alone may be encouraging students away from the academic benefits clarified through this research.

Recommendations for Future Research

This research was strictly quantitative. As an outcome, the results of the findings are strictly performance-based regarding GPAs, attendance, and suspension. It is the recommendation of this researcher a mixed-methods approach to this topic be explored. Through the mixed-methods approach, this researcher recommends interviewing all stakeholders in the athletic participation process. This would include students, coaches, parents, teachers, and administrators. The interviews should be centered on obstacles that prevent multiple-sport participation, attitudes of all stakeholders that impact multiple-sport participation and what perceptions different stakeholders have about sport specialization and multiple-sport participation. These interviews should then be

compared to multiple-sport participation rates of student athletes in their respective schools. This approach could allow researchers to determine if there are themes in a school community environment that promote or inhibit multiple-sport participation.

A second recommendation for future research relating to multiple-sport participation includes an in depth study into no-cut policies relating to team selection processes and high school athletics. A no-cut team is one that allows all players who wish to participate on a team the opportunity to do so assuming they abide by all school and team policies. This means a student who has washed-out of one sport or does not have the abilities required to compete at the necessary level in a particular sport could have the opportunity to participate in the more-inclusive no-cut program. Oftentimes, there are greater opportunities for younger athletes to get involved in multiple sports through opportunities such as freshman and/or “C” teams. However, as the age of the student increases and the skill-level requirements increase to continue participation in certain sports, some students do not make the required growth and discontinue participation in that sport. In these instances, it should be a priority to encourage these students to seek out opportunities for participation in sports programs that are more inclusive of less-talented and/or less-experienced athletes through their no-cut philosophy.

This researcher recommends that further research be conducted into the extent to which schools offer no-cut programs and the effectiveness those no-cut teams have on multiple sport participation in those particular schools. By clarifying if no-cut programs have a significant impact on multiple-sport participation, schools could take proactive measures to determine if no-cut team selection processes could benefit their students.

Since this research has clarified multiple-sport participation can have academic benefits for students, research should be pursued to determine if no-cut policies can improve multiple-sport participation and what is ultimately best for students.

Summary

This quantitative study was created to clarify if significant differences exist between athletes who participate in one sport and athletes who participate in multiple sports. Measureable data were collected that allowed the researcher to compare differences in academic and behavioral performance between single-sport and multiple-sport athletes. If it was determined a significant difference did indeed exist, the researcher clarified where exactly the significant differences occurred.

In Chapter One, the historical background of the study and conceptual framework were discussed. The statement of the problem, the purpose of the study, and the research questions and limitations were also discussed. Along with these items, key terms and variables were introduced in Chapter One. In Chapter Two, a review of varying research on sport specialization was provided.

A description of the problem and purpose was reintroduced in Chapter Three. The methodology used in this quantitative study, along with the research setting, demographics, population, and sample, were also described in Chapter Three. The data collection and analytic procedures were discussed in Chapter Three.

In Chapter Four, secondary data were presented as provided by participating schools derived from eligibility rosters from the MSHSAA. The data were placed in figures and tables and examined via the outcomes of ANOVA tests and Tukey HSD post-hoc tests.

In Chapter Five, research questions were answered with data collected. Findings and conclusions were discussed and evaluated. Research question one data revealed a significant difference existed in GPAs, as multiple-sport athletes in Class 3 and 4 schools had higher GPAs than students who participated in just one sport. Research question two data showed significant differences in hours absent for all students, with students who participated in multiple sports demonstrating better attendance than students who participated in a single sport. In response to research question three, data showed significant differences in days suspended existed for all students, with students who participated in multiple sports showing reduced suspensions when compared to students who participated in a single sport.

Several findings in this study support the literature in Chapter Two that indicate in most cases, it is in the best interest of the child to participate in multiple sports. There are inherent benefits to multiple-sport participation in the academic arena in addition to the physical and mental benefits described in the literature referred to in Chapter Two. It is the conclusion of this researcher the majority of students should be encouraged to participate in as many athletic opportunities throughout their high school experience as possible.

Appendix A

Permission Letter for Superintendent

To: School Superintendent
 From: Chris Kohl
 Date: February 9, 2017
 RE: Anonymous athlete data

Dear Superintendent,

My name is Chris Kohl, and I write seeking your permission to collect anonymous secondary data for my doctoral dissertation titled, *The Academic and Behavioral Impact of Multiple Sport Participation*.

In short, I would like to print eligibility rosters from the MSHSAA website and collect anonymous aggregate data including GPAs, hours of absence, and days of suspension for your student athletes from the 2015-2016 school year. I have discussed this with your building-level administrators, and it appears they would be supportive in assisting my efforts.

As part of your participation, you will receive full access to the results of my study which will seek to provide clarification concerning academic and behavioral differences between students who participate in one sport and students who participate in multiple sports. With the current rise in rates of overuse injuries in student athletes due to sport specialization, this research may be valuable to your school community. At no point in this research will your school district be identified.

Please indicate below if you are/are not willing to participate in this research. If you choose to participate, you can withdraw from participation at any point with no reason and without penalty. I greatly appreciate your time!

Highest Regards,

Chris Kohl


Check One:

_____ We are willing to participate

_____ We are not willing to participate

Superintendent signature: _____ Date: _____

School District: _____

Appendix B

Disposition Letter from IRB Committee



DATE: March 6, 2017

TO: Christopher Kohl
FROM: Lindenwood University Institutional Review Board

STUDY TITLE: [1027473-1] The Academic and Behavioral Impact of Multiple Sport Participation

IRB REFERENCE #:
SUBMISSION TYPE: New Project

ACTION: DETERMINATION OF EXEMPT STATUS
DECISION DATE: March 6, 2017

REVIEW CATEGORY: Exemption category # 1

Thank you for your submission of New Project materials for this research study. Lindenwood University Institutional Review Board has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations.

We will put a copy of this correspondence on file in our office.

If you have any questions, please send them to IRB@lindenwood.edu. Please include your project title and reference number in all correspondence with this committee.

This letter has been electronically signed in accordance with all applicable regulations, and a copy is retained within Lindenwood University Institutional Review Board's records.

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Vita

Chris Kohl is husband to Ashley Grace and father to Grace Jalynn and Adam Joseph. Chris was born in Stevens Point, Wisconsin, to Janice Lynn and Thomas Joseph in 1975. Chris has lived in southwest Missouri since 2000 and has worked with thousands of student athletes, teachers, and parents as a tennis coach, teacher, and administrator. For recreation, Chris enjoys fishing, hunting, and spending time with his family. Chris earned his Bachelor's degree in Speech Communications and Elementary Education through the State University of New York at Potsdam, his Master's degree in Administration through William Woods University, and his Specialist Degree in Administration through Lindenwood University.