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Brittany Erdmann

*Shawnee State University*

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**SHAWNEE STATE UNIVERSITY**

**Effects of Sports and Student Motivation on Academic Success**

A Thesis

By

**Brittany Erdmann**

Department of Mathematical Sciences


Submitted in partial fulfillment of the requirements

for the degree of

Master of Science, Mathematics

**July 23, 2021**

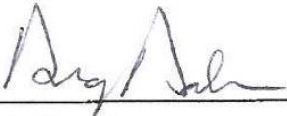
Accepted by the Graduate Department

 7/23/2021

Graduate Director, Date

The thesis entitled '**Effects of Sports and Student Motivation on Academic Success**', presented by **Brittany Erdmann**, a candidate for the degree of **Master of Science in Mathematics**, has been approved and is worthy of acceptance.

7/23/2021  
Date

  
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## **ABSTRACT**

In the past 50 years, high school sports have been on the rise with more and more students deciding to participate in a high school sport. Because of this, it is important that schools, parents, and students look at the research behind how sport participation effects academic success. There have been studies that show sports having a positive effect on academic success, there have been studies that have shown that the intrinsic motivation is strongly correlated with academic success, and there have been studies that have shown that sport participation increases motivation to perform. The current study seeks to bridge the gap between the three components of sport participation, student motivation, and academic success. The current study examines how student motivation in the classroom (intrinsic, extrinsic, and amotivation) and sport participation (team, individual, both, or none) affects academic success. The study was conducted at Lutheran West High School by means of gathering data on student GPAs, sports participation, and type of motivation. Type of motivation was gathered through student surveys to find the levels of motivation a student perceives of themselves and teacher surveys to find the level of motivation the teacher perceives of the student. Statistical techniques of multiple regression, factor analysis, correlation tests, and ANOVA techniques were used to test and answer the research questions. The study found that there is no direct relationship between sport participation and academic success. However, the study found a strong positive relationship between motivation (not necessarily intrinsic or extrinsic) and academic success. The study also found a positive relationship between sports and motivation. Thus, the study argues to have found an indirect relationship with academics and sport participation by interpreting that sport participation increases motivation and motivation increases academic

success. The Self-Determination Theory states that those who are involved in environments that promote competence, autonomy, and relatedness, have a higher likelihood of possessing intrinsic motivation. Research shows that higher levels of intrinsic motivation increases academic success. Thus, creating environments that promote competence, autonomy, and relatedness are good for academic success. It could be possible that sports are one of these environments, but are not the only one. It is shown in the current study that motivation plays a strong positive role in academic success. The current study concludes that schools should continue to recommend and encourage environments that promote competence, autonomy, and relatedness to increase student motivation. Sports could be promoted as one of these environments that help students increase their motivation to increase their academic success.

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I would like to thank my friends for all their hard work and support. To Bethany and Laurie for their encouragement and to Laurie allowing me to finish my degree in her spare bedroom. To Cal for being my study partner and confidant. To Judy for all her proofreading. To all my other friends who continued to support and lift me up when times seemed daunting.

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## **CHAPTER I: INTRODUCTION**

Chapter 1 will introduce the research study on the effects of sport and motivation on academic success. Chapter 1 will also address the research problem, the purpose of the study, the research hypotheses, and the significance of the study. The chapter will conclude with an overview of the organization of the thesis.

### **Introduction of the Study**

In the ever-growing world of high school sports (*NFHS*, 2021), many students and their parents have to make the decision on whether or not to participate in high school athletics. As athletics continue to grow, it is important for schools to recognize the impact sport participation plays on academics. Many teachers, coaches, and students could say that it takes motivation to play a sport and it takes motivation to earn good grades. Three types of studies have been investigated: sports, motivation, and academic success. There have been studies that research the link between academics and extracurriculars (Broh, 2002; Fejgin, 1994; Im et. all, 2016; Marsh, 1993; McNeal, 1995). There have also been studies that research the relationship between motivation and types of sports in which students participate (Kucukibis, 2019; Francisco, 2018; Toktas and Bas, 2019; Jakobsen, 2014). Finally, there have been studies that research the relationship between motivation and academic success (Gottfried et. all, 2005; Vansteenkiste et. all, 2004; Lepper et. all, 2005; Algharaibeh, 2020). The current study seeks to research if there is a relationship between all three: motivation, sport participation, and academic success.

## **Background of the Problem**

High school sports and extracurricular activities have become an important part of student's lives as sports and clubs continue to grow in high schools around the country (*NFHS*, 2021). Students are faced with the decision each year and each season if they should participate in a school sport or participate in an additional extracurricular activity. Many students and their parents base this decision on the student's academics and concerns that participating in an extracurricular activity will deter the student from doing well academically. There have been many studies (see Broh, 2002; Fejgin, 1994; Im et. all, 2016; Marsh, 1993; McNeal, 1995) conducted to research the relationship between extracurricular activities and academic successes. A majority of these studies have found positive correlations between extracurricular activities and academics leading to theories as to why positive correlations between extracurriculars and academics have been found (Marsh, 1993; Fejgin, 1994; McNeal, 1995). Marsh (1993) notes that researchers, Snyder and Spreitzer (1990) have a theory for six reasons why participation in a sport may enhance academic outcomes. These six reasons are "(1) increase interest in school, including academic pursuits, (2) high academic achievement in order to maintain eligibility to participation in sport, (3) increases self-concept that generalizes to academic achievement, (4) increased attention from coaches, teachers, and parents, (5) membership in elite groups and orientation toward academic success, and (6) expectations of participating in college sport" (Marsh 1993). Marsh (1993) further notes that researchers Holland and Andre (1987) conclude that further total development of individual students comes from participating in extracurricular activities. From Holland and Andre's perspective, participation in extracurricular activities creates not only non-academic goals, but helps develop

“narrowly defined” goals of academics” (Marsh 1993). Researchers believe that athletics establishes a common goal for the school, and athletics teach student-athletes values of competition, determination, fair play, and achievement. These psychological values then carry over to their academics and have a positive effect on their academic success (Fejgin 1994). Other researchers believe that participating increases communication in the school community, which has a big role in student success. Broh’s (2002) study seeks to find the relationship between athletics and social networks such as communication between parent and student, parent and teacher, and teacher and student. He theorizes that increase in social networks and communication allows for engagement in academic related interactions and thus increases academic success (Broh, 2002).

Not all theories surrounding sports and academics are positive. One theory, developed by Coleman (1961), that sheds a negative light on extracurricular activities is his zero-sum theory. Coleman’s (1961) zero-sum theory argues that extracurricular activities (presumably, athletics) will deter focus from academics and thus academics will suffer. Another theory is mentioned by Fejgin (1994) in her study on the effect of sports on school goals. Fejgin (1994) notes that some theorists believe that sports can have negative effects on students who do not participate and create tension and divide in the student body.

There have been research studies done to explore the effect of sport on academic success, and each study has been conducted in a different way with different variables. Some of these studies are conducted by looking at the effect of extracurricular activities and maintain “sport” as one entire extracurricular activity (Marsh, 1993; McNeal, 1995). Other studies have included sub groups to athletics such as junior varsity participation, varsity participation, and

intramural participation (Fejgin, 1994; Broh, 2002). Still other studies focus on each specific sport as a whole group, like basketball or volleyball, and consider the length for which a student played a sport (Bowen and Greene, 2012; Im et. all, 2016). This study seeks to look at sport groupings in a new way: whether the student played only a team sport, only an individual sport, both team and individual, or no sport during their high school career.

Studies on the effects of sports and academics with will oftentimes have an added layer to the study such as socioeconomic status (Marsh, 1993; McNeal 1995), race (Marsh, 1993; McNeal, 1995; Fejgin, 1994), or dropout rates (McNeal, 1995). An added layer to this study will be to focus on student motivation. Motivation plays a role in a student's success in all aspects of their high school life. A student can have intrinsic motivation tendencies, extrinsic motivation tendencies, or amotivation tendencies. Intrinsic motivation refers to "behavior that is driven by internal rewards" (Cherry, 2019), extrinsic motivation refers to "behavior that is driven by external rewards such as money, fame, grades, and praise" (Cherry, 2021), and amotivation refers to "lacking motivation, purpose, or direction" (Lexico Dictionaries). Type of motivation can be researched across what type of sport in which a student participates and a student's academic success. There have been studies that look at motivation and how it relates to the type of sport: team or individual (Kucukibis and Gul, 2019; Jakobsen 2014; Šmela et. all, 2017). Jakobsen (2014) and Kucukibis and Gul (2019) conducted studies to research the relationship between type of motivation (intrinsic or extrinsic) and whether an athlete is involved in an individual sport, like golf, or a team sport, like basketball. These studies have mainly found that students who participate in either individual or team sports have no difference in levels of intrinsic and extrinsic motivation (Kucukibis and Gul, 2019; Jakobsen

2014). Šmela, Pačesová, Kraček, & Hájovský (2017) found that playing a sport does result in higher levels of motivation in general. On the academic side of motivation, there have been studies to look at the relationship between type of motivation and academics. Looking to see how type of motivation affects academics, there have been studies that found the academically gifted students had high levels of intrinsic motivation (Gottfried et. al, 2005) and students who are highly motivated do better academically (Lepper et. al, 2005)

The question then is “Is there a bridge between the sport vs. academic, sport vs. motivation, and motivation vs. academic studies?”. This current study seeks to bridge the gap between the sport vs. academic studies, the motivation vs. sport studies, and the motivation vs. academics studies. It seeks to find a relationship between type of motivation and the type of sport in which a student participates (TEAM, INDIVIDUAL, BOTH, or NONE) and tell if that relationship predicts the student’s academic success. Ultimately this study would like to dive deeper into the question: “Does playing a sport have an impact on academic success?”

The current study will use different statistical methods to conduct the research. Type of motivation (intrinsic, extrinsic, or amotivation) will be measured using a student motivation survey (AMS – Academic Motivation Scale) (see Appendix C) and general student motivation will be measured by a teacher survey that finds teacher perceived motivation of a student (ACES - Academic Enabler Scale) (see Appendix D). The type of sport the student plays or has played during their current year of high school will be grouped into four different categories (TEAM, INDIVIDUAL, BOTH, or NONE). The students’ academic success will be measured using data on the student’s GPA. The data and surveys will be analyzed, and the researcher will conduct tests and techniques of Factor Analysis, ANOVA, Correlation Tests, and Multiple

Regression to better understand the relationship between motivation, playing a sport, and academic success.

### **Statement of the Problem**

Many studies that focus on researching the relationship between sports and academic success focus on either sport as an entire group, specific sports like basketball and volleyball, or the length at which a student played a sport (Marsh, 1993; McNeal, 1995; Bowen and Greene, 2012; Im et. all, 2016). There have also been studies that research the type of motivation an athlete exhibits (intrinsic, extrinsic, or amotivation) and the type of sport they play (team or individual) (Kucukibis and Gul, 2019; Jakobsen, 2014; Šmela et. all, 2017). This study seeks to bridge the gap between the motivation studies and sports vs. academic success studies. This current study will not focus on sports as a whole group, specific sports, or length of participation, but will look at whether a student plays an individual sport, team sport, both, or no sport. This study seeks to then research the relationship between the type of sport a student plays, the motivation he or she exhibits, and the student's academic success. The overarching goal of this study is to examine if playing a certain type of sport influences a specific type of motivation and if academic success is predicted by type of sport and type of motivation.

### **Purpose of the Study**

This study's purpose is to examine if motivation and the type of sport is predictive of academic success. The variables include GPA, student grade level (senior, junior, sophomore, freshman), student survey scores (AMS), teacher survey scores (ACES), and type of sport



(TEAM, INDIVIDUAL, BOTH or NONE). These variables will be measured both quantitatively and qualitatively. Academic success, measured through students' GPA, is a quantitative measure. The type of motivation and level of motivation of a student will be measured by the student and teacher survey scores which will be assessed with quantitative data. Finally, the type of sport a student plays (TEAM, INDIVIDUAL, BOTH or NONE) and grade level will be measured by qualitative data. The independent variables of this study are the student and teacher survey scores on motivation and the type of sport in which a student participates. These variables will be used to predict the student's academic success measured by the student's GPA.

The variables have each been found appropriate to be used in this study. The variable of GPA is a justified measure that schools use to determine academic success country and state wide. The student survey (AMS) and teacher survey (ACES) have been justified by Cronbach's alpha values. The validity in the ACES survey can be validated with a Cronbach's alpha from .94-.99 (The Psychological Corporation, 2001). The validity in the AMS survey can be validated with an average Cronbach's alpha of .81 (Vallerand et al., 1992). The type of sport in which a student participates will be taken from the appropriate school's database that accurately indicates what type of sport the student participated in during the school year of 2020 – 2021.

The study will be conducted at Lutheran West High School in Rocky River, Ohio which has a student body of about 500 freshmen to senior students. Any student-athlete, with permission from a parent or guardian, can participate in this study.

### **Significance of the Study**

Each school year, students and their parents have to decide if their student should participate in a school sport. They have to decide if they are willing to put their time into the

sport season, which potentially runs the risk of taking time away from academics (Coleman, 1961). Many times, coaches are faced with the difficulty of talking to parents and students about this issue. Research has shown that participating in a sport leads to improvement in academics (Broh, 2002; Marsh 1993), more aspirations to attend college (Rehberg and Schafer, 1968), and fewer discipline problems (Fejgin, 1994). Research has also shown that students participating in sport competitions that are safe and encouraging increase student self-confidence and motivation (Toktas and Bas, 2019). It has been found that students participating in a sport have both extrinsic and intrinsic motivation (Kucukibis and Gul, 2019). The motivation found in sports may or may not correspond to motivation in the classroom. Studies have shown that students who are more intrinsically motivated have a deeper learning of academic material (Vansteenkiste et. all, 2004; Lepper et. all, 2005). This current study seeks to find if the type of sport (team, individual, both or none) correlates with type of academic motivation and if that motivation is related to the success found in the classroom. This study hopes to bring some research into helping coaches, teachers, parents, students, and administrators address the issue of sports and the effects it may have on the classroom. It seeks to help coaches, teachers, and administrators have a better understanding of the effects of sports and motivation on academic success to better be able to communicate to students and parents about participating in a sport. With more information on the relationship between sports, motivation, and academic success, coaches and administrators may be able to have fuller discussions with the school and parents about a student's decision to play a sport.

## **Primary Research Questions**

The primary research questions for this study are:

Primary Research Question: Is participating in a team sport, individual sport, both, or no sport and a student's motivation (intrinsic, extrinsic, or amotivation) predictive of a student's academic success?

Secondary Research Questions #1: Is there a significant difference in intrinsic motivation scores and type of sport?

Secondary Research Questions #2: Is there a significant difference in extrinsic motivation scores and type of sport?

Secondary Research Questions #3: Is there a significant difference in amotivation scores and type of sport?

Secondary Research Questions #4: Is there a significant difference in student GPA and type of sport?

Secondary Research Question #5: Is there a difference in teacher perceived motivation scores and type of sport?

Secondary Research Questions #6: Is there a relationship between teacher perceived motivation scores and student intrinsic, extrinsic, or amotivation scores?

Secondary Research Questions #7: Is there a relationship between teacher perceived motivation scores and student GPA?

Secondary Research Questions #8: Is a student's motivation, as perceived by the teacher, and type of sport predictive of a student's academic success?

### **Hypotheses**

Hypothesis #1: Participating in a team sport or individual sport and a student's motivation (intrinsic, extrinsic, amotivation) does not predict a student's academic success.

Hypothesis #2: There is no difference between student intrinsic motivation score and type of sport.

Hypothesis #3: There is no difference between student extrinsic motivation score and type of sport.

Hypothesis #4: There is no difference between student amotivation score and type of sport.

Hypothesis #5: There is no difference between student GPA and type of sport.

Hypothesis #6: There is no difference between teacher perceived motivation scores of a student and type of sport.

Hypothesis #7: There is no relationship between teacher perceived motivation scores and student intrinsic, extrinsic or amotivation scores.

Hypothesis #8: There is no relationship between teacher perceived motivation scores and student GPA.

Hypothesis #9: Student's motivation, as perceived by the teacher, and type of sport is not predictive of a student's academic success.

### **Research Design**

The study will be conducted at Lutheran West High School in Rocky River, OH which has a student population of 500 freshmen through seniors. The study needs 300 participants to run appropriate tests. Each student is required to obtain permission from their guardian to participate and, because of this, not all 500 students are likely to participate. A student survey (AMS) and a teacher survey (ACES) will be conducted to measure student motivation in academics from the student's perspective and from the teacher's perspective. Data from the school's databases and Renweb will be collected for students' GPA, grade level, and type of sport. Once parent permission is received, the student motivation survey (AMS) will be given to the appropriate students using Google Forms. Consent forms will also be collected from each teacher. Once these consent forms are acquired from each teacher, teachers will fill out a paper survey (ACES) on each student participating in the study. All data on GPA, grade type sport, student survey responses, and teacher survey responses will be compiled into an Excel spreadsheet that will match the student's ID number with the appropriate data.

Statistical tests will be run on the data using the statistical software, R. Factor analysis will be run on the student surveys to create factor scores as variables for measures of student motivation. The responses from the teacher surveys will be added together to create one composite teacher motivation score for each student. An ANOVA test will be used to test if there is a difference between students' intrinsic motivation levels and type of sport in which a

student participates (Secondary Research Questions #1). An ANOVA test will be used to test if there is a difference between students' extrinsic motivation levels and type of sport in which a student participates (Secondary Research Questions #2). An ANOVA test will be used to test if there is a difference between students' amotivation levels and type of sport in which a student participates (Secondary Research Questions #3). An ANOVA test will be used to test if there is a difference between students' GPA and type of sport in which a student participates (Secondary Research Questions #4). An ANOVA test will be used to test if there is a difference between motivation perceived by the teacher and type of sport in which a student participates (Secondary Research Questions #5). A correlation test will be used to determine if there is a relationship between student motivation scores and teacher perceived motivation scores. (Secondary Research Question #6). A correlation test will be used to determine if there is a relationship between teacher perceived motivation scores and student GPA. (Secondary Research Question #7). Multiple linear regression techniques will be conducted to find if a student's motivation, as perceived by the teacher, and type of sport is predictive of a student's academic success (Secondary Research Questions #8). Finally, multiple regression techniques will be conducted to find if participating in a team sport or individual sport and a student's motivation (intrinsic, extrinsic or amotivation) is predictive of a student's academic success (Primary Research Question).

### **Theoretical Framework**

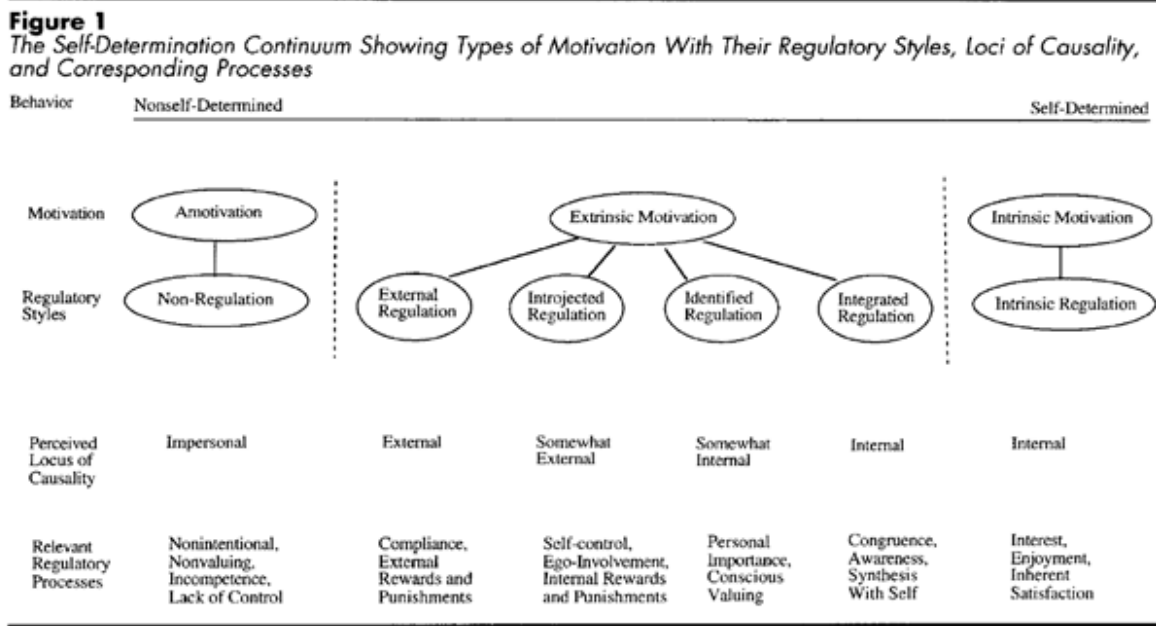
At humanity's finest, the world finds people to be curious, inspired, and self-motivated. However, these characteristics are sometimes lost or missing from people's lives. The world, at times, sees people choosing to spend their time mindlessly flipping through social media or

disengaged in classrooms. To understand how to encourage the inspired and curious side of people, one must understand how motivation works (Ryan and Deci, 2000). Ryan and Deci's (2000) "Self-Determination Theory" seeks to investigate the basis for people's self-motivation and personality traits as well as the types of factors that lead to these traits. Ryan and Deci explain that there are three needs for the process of developing self-motivation: competence, relatedness, and autonomy. There are three types of motivation on which Ryan and Deci focus. The first is amotivation which is defined by lacking motivation or having no motivation to complete a task (Lexico Dictionaries). The second is extrinsic motivation, which is completing a task for external incentives (Cherry, 2020). The third is intrinsic motivation, which is completing a task purely out of self-interest and self-reward (Cherry, 2019). Ryan and Deci (2000) report the highest form of motivation and the trait that keeps people tackling challenges day after day is said to be intrinsic motivation.

Ryan and Deci created two sub theories from their Self Determination Theory: Cognitive Elevation Theory (CET) and Organismic Integration Theory (OIT) (Ryan and Deci, 2000).

Cognitive Elevation Theory (CET) looks at factors that help produce intrinsic motivation and Organismic Integration Theory (OIT) looks at the different forms of extrinsic motivation and the factors that influence these different forms. CET theorizes that the more a person has a sense of autonomy, competence, and relatedness, the more he or she is self-determined. Self-determination leads to intrinsic motivation and high motivation to complete tasks. Ryan and Deci configured a diagram (Figure 1) to show the different types of motivation. Each type represents a different level of self-determination. The diagram starts with amotivation on the right (no motivation), then moves to the extrinsic motivation which has six sub categories, and

finally reaches intrinsic motivation on the left (highest level of self-determined motivation) (Ryan and Deci, 2000).



Ryan and Deci conclude that environments that emphasize autonomy and competence facilitate higher levels of intrinsic motivation rather than environments that are controlling and makes one feel less effective. They found that social contexts play a big role in their theory. Creating social contexts that allow for autonomy, competence, and relatedness, “is of great significance for individuals who wish to motivate others in a way that produces commitment, effort, and high-quality performance” (Ryan and Deci, 2000).

**Assumptions, Limitations, and Scope**

The integrity of the results of this study is reliant of two important assumptions: (1) teachers and students will answer their surveys truthfully; and (2) data accuracy. This study also has inherent limitations. For example, due to the COVID-19 pandemic, students have an



option to learn remotely. This will limit the accuracy of student's GPAs compared to a normal school year. Sport season could also be cut short or cancelled all together due to the COVID-19 pandemic. This could limit the study in the type of sport data available for each student. Another limitation would be, due the way grades are calculated and the timeline of the study, the student GPA will be taken from first semester only. This could skew data when compared to looking at sport participation across the whole school year.

This study will be conducted at a small, suburban, private high school. It cannot be generalized to large public schools, but only other small private schools. The researcher could have asked larger private or public schools for information on their student body and permission to survey those schools' students and teachers. However, for convenience of acquiring the data in a timely manner and the population with which the researcher is involved, conducting the study at the researcher's school was decided for this study.

### **Definition of Terms**

AMS – Academic Motivation Scale. This is the student motivation survey to measure the type of motivation a student has for academics.

ACES – Academic Competence Evaluation Scale. The scale consists of two surveys. Only the ACES Academic Enabler Scale will be used for this study. This is the survey given to teachers measure the amount of motivation a teacher perceives a student to possess and find the teacher perceived motivation score for each student.

GPA – Grade Point Average ranging from 0.0 to 4.0. Students' unweighted GPA will be used.

Type of Sport – described by whether the student is playing strictly team sports (TEAM), strictly individual sports (INDIVIDUAL), both team and individual (BOTH), or no sport (NONE) in the year 2020 - 2021.

Academic Success – measured by GPA (Grade Point Average, 0.0 to 4.0)

Renweb – Grading system used by Lutheran West High School

Grade Level – The grade level for each student in the study: Freshman (9th), Sophomore (10th), Junior (11th), Senior (12th).

Teacher Motivation Score - The total motivation the teacher perceives each student to exhibit in the classroom. This is found through the ACES Academic Enabler Scale.

## **Summary**

Chapter 1 introduced the problem to be investigated which is the relationship between the type of sport a student plays, the motivation he or she has for academics, and the student's academic success. The study would like to research if playing a certain type of sport influences a specific type of motivation and if academic success is predicted by type of sport and type of motivation. This research will help schools better understand if they should be encouraging their students to participate in sports.

In Chapter 2, the literature for the topic will be reviewed. The literature includes studies on the different research done to find the effects of sports on academic success. Studies that research the relationship between types of motivation and types of sports and studies that

research the relationship between academic success and type of motivation will also be reviewed.

The next three chapters will consist of methodology, results, and conclusions. In Chapter 3, the data collection procedures, surveys, participants, and testing methods will be described in detail to explain how this current study will be conducted. In Chapter 4, the results and findings of this current study will be stated. In Chapter 5, the final conclusions for this study will be stated.

## CHAPTER II: LITERATURE REVIEW

### Introduction

This chapter will give an overview of the history of sports at the high school level and studies surrounding academics, sports, and student motivation. Studies surrounding high school sports and the effects sports may have on academic success will be reviewed. This chapter will review studies on the relationship between motivation and type of sport and motivation and academics. This chapter will also give a synopsis of the Self Determination Theory that dives deeper in types of motivation a person can possess and the characteristics a person can exhibit based on their type of motivation.

### History of Sports in School

In the past 50 years, the number of students who decide to participate in school sports has drastically increased (*NFHS*, 2021). Since 1971, there has been a 5 million student-athlete participation increase in high schools and the only decrease in athletic participation was seen between the school year of 2017 – 2018 and 2018 – 2019 (*NFHS*, 2021). Bowen and Hitt (2016) suggest that historical events find reason for this growth because Americans believed the following three things about sports and academics: “(1) adolescence have an inherent, organic passion for athletics; (2) sports increase student engagement in school communities; and (3) underserved populations would not have access to certain valuable extracurricular activities unless schools provided them”.

In 1852, Massachusetts enacted compulsory education laws which mandated every city to offer and require a primary school for children. Parents who did not send their children to

school were fined, and sometimes their parental rights were taken from them. This made Massachusetts the first state to require students to attend school. Sixty-five years later in 1917, Mississippi became the last state to mandate students to attend school (*Compulsory education laws: Background*, 2016). Because part of adolescents' time was now taken by school, their daily routines drastically changed. Children were now obligated to attend school, so they had to decide how to make the most of their “free time” outside of school. Underclass students who lived in crowded neighborhoods would often run the streets, so adults had to find something for children, especially the underclass, to do when they were not in school (Friedman, 2013). Athletic activities held a high view in the eyes of adults to teach children good values. Thus, sports became the answer (Bowen and Hitt, 2016). Sports were viewed as a way to teach children cooperation, hard work, and respect for authority. Some thought that athletic activities would prepare children for adult life by preparing them for physical labor (Friedman, 2013). Parks and playgrounds became the first option to encourage athletic activity. They provided a place for school children to play sports in their free time. However, adults grew concerned with children playing unsupervised, and thus needed to find a way to make sports more organized (Friedman, 2013).

In New York City, the year of 1903, the Public Schools Athletic League (PSAL) was created (Bowen and Hitt, 2016). PSAL allowed for children from grades 5<sup>th</sup> – 8<sup>th</sup> to participate during specific times a year in “class athletics” which included track and field, baseball, football, basketball, and swimming. By 1915, similar leagues were created in 177 cities. These leagues were organized with the thought that competitive athletic activities would create healthy, strong bodies and minds in children. At the high school level, sports were competed through

athletic clubs not necessarily associated with the school. School faculty and administrators had growing concerns about outside club sports' effect on high school students and had the desire to have more control over athletic competition. Thus, they sought to associate sports to the school organization. In 1921, Illinois, Indiana, Iowa, Michigan, and Wisconsin formed the Midwest Federation of State High School Athletic Associations. In 1923, the association became the National Federation of State High School Athletic Associations, also known as NFHS (Malina, Gilbert, & Shields). Today, NFHS serves 51 states and 19,500 high schools. The NFHS writes sport rules and provides guidance on national issues with the goal of ensuring “that all students have the opportunity to enjoy healthy participation, achievement, and good sportsmanship in education-based activities” (National Federation of State High School Associations, 2021).

In 1929, the start of the Great Depression began and school-sponsored sports were put on hold. Budget cuts had to be made and youth sports were discontinued (Bowen and Hitt, 2016). Sport groups, such as the YMCA, and organizations, such as Pop Warner Football and Little League Baseball, stayed available for adolescents to participate in athletic activities. The problem came from the fact that adolescents had to pay to participate in these groups and organizations. This left poor, less advantaged children unable to have an opportunity to participate in athletic activities (Friedman, 2013). After the end World War II, in 1945, high school sports came back stronger than before with high school athletic programs eventually becoming the pride of small towns across the United States (Freidman, 2013). Student participation in school sports grew rapidly over the next 70 years with data reporting close to 8 million male and female high school students' participation in athletics in the school year of 2018-2019 (NFHS, 2021).

Sports competitions started as a way to instill good American values in young boys who played them. Administrators found that poor grades and dropout rates of boys were more likely than the girls. School faculty thought allowing boys to participate in sports would “instill more masculine tone and temper in the schools” (Malina, Gilbert, & Shields). Sports would also distract them from gambling and prostitution and create a more moral citizen (Ripley, 2014). In 1972, Title IX was established and girls were then given as equal opportunity to participate in athletics as boys. By the 1970s and 1980s, students and parents saw sports as a way to get into “top” colleges and sport participation became even more intense (Freidman, 2013).

History has shown that sport participation has continued to be important in the eyes of those that promote them. Throughout the decades, sports have been seen as beneficial to students, yet sports in school are continuing to be under attack. Three of the most common arguments surrounding school sports are: (1) “Sport participation has no role in academic development; in fact, sports might undermine academics”; (2) “Adopting European-style sports club programs would enable adolescents to participate in sports while eliminating any negative influences that school-sponsored athletics have on academics”; (3) “Eliminating school-sponsored sports will increase student participation in other extracurricular activities” (Bowen and Hitt, 2016). With so many questions about the effect of sports on academic performance, researchers began conducting studies to find statistical evidence on whether high school sports hinders or encourages academic success.

## **Sport Participation vs. Academics Studies**

What started as a way for young boys, in the 1800s and 1900s, to have something health beneficial to do in their “free time”, (Ripley, 2014; Malina, Gilbert, & Shields), has now grown to into an activity that almost 8 million high school boys and girls participate in today (*NFHS*, 2021). With more than 50 sports now being offered throughout high schools across the country (*NFHS*, 2021), America has seen high school sports become a part of many students' high school experience. Because of the rise in student participation, many researchers have conducted studies on the concern that sport participation affects student academic performance (see Broh, 2002; Fejgin, 1994; Im et. all, 2016; Marsh, 1993; McNeal, 1995). These studies investigate how participating in a sport affects a student’s academic performance, dropout rates, college attendance, the school’s goals, and the community’s involvement in a student’s high school career.

Research surrounding high school sports has found that athletic participation increases test scores, grades, education aspirations, and parental involvement and a decrease in dropout rates and discipline problems (Lipscomb, 2007; Fejgin, 1994; McNeal, 1995; Marsh, 1993). In his study, “The Effects of Participation in Sport During the Last Two Years of High School”, Marsh (1993) investigates participation in a school sport over a wide variety of academic outcomes while controlling for background variables such as social-economic status, gender, and race. His independent variable was whether the student was a sport participant, non-participant, or leader/officer. His study examined the relationship between participation in sports and 22 academic outcomes such as a student’s standardized achievement tests, GPA, coursework selection, self-concept, locus of control, absenteeism, getting in trouble,



educational and occupational aspirations, and educational attainment. He found that sport participation had a positive statistically significant effect on 14 out of the 22 outcomes. These 14 outcomes included social self-concept, academic self-concept, educational aspirations both in high school and two years after, attending a university, school attendance, time spent on homework, taking math and science courses, parent involvement, and taking honors courses. He found no negative effects but found that sport participation had no statistically significant effect on the other eight variables that included standardized test scores and school grades (Marsh, 1993). Fejgin (1994) conducts a similar study with slightly different outcomes.

Fejgin (1994) conducted a study to examine the relationship between sport participation and 10<sup>th</sup> grade student grades, self-concept, locus on control, discipline problems, and educational aspirations while controlling for background variables such as gender, race, standardized test scores, family income and education, and previous school years grades. Sport participation was measured by a questionnaire that investigated if a student participated in intramurals, on a junior varsity or freshman team, on a varsity team, was a captain, or did not participate in one or more sports such as basketball, football, swim, soccer, cheer, other team sport, or individual sport. She developed a composite score based on the surveys that ranked a student's participation in high school sport. Unlike Marsh (1993), Fejgin (1994) found that high school sport participation had a positive effect on school grades. She also found that students who participate in high school competitive sports have higher self-concept, higher educational aspirations, more locus of control, and fewer discipline problems. There have been many other studies conducted that have found a positive relationship with sports and academic performance. These studies include findings such as those participating in middle school sports

have a better sense of identity and have higher grades in high school (Im et. all, 2016), are more likely to attend college (Snyder and Spreitzer, 1990), and have higher math and science scores (Broh, 2002). Even with the growing studies of positive relationships with school and sport, there are still theories and studies that are skeptical of this positive effect.

Coleman (1961) developed a theory that disagrees with the research that sports have a positive effect on academic performance. Coleman's (1961) zero-sum theory argues that extracurricular activities (presumably, athletics) will deter focus from academics and thus academics will suffer. Another theory is mentioned by Fejgin (1994) in her study on the effect of sports on school goals. Fejgin (1994) notes that some theorists believe that sports can have negative effects on students who do not participate and create tension and divide in the student body. Guest and Schneider (2003) conduct a study that may influence a student's decision to participate in sports based on how athletes are recognized at the school. Guest and Schneider found that participating in a school sport is good for academic achievement, but identifying as an athlete influences how a student is perceived depending on the school. Students sometimes see sports as part of the "building of a portfolio" to apply for college. Guest and Schneider find that lower- and middle-class schools, where students may be less likely to attend a four-year college, see athletes as "good students" and "having an athletic identity is most strongly associated with positive outcomes" such building a good student portfolio and social mobility. However, upper class schools where most students attend a four-year college see athletic participation as a detriment to the "good student portfolio" and being an athlete is associated with a lack seriousness (Guest and Schneider, 2003). Even though some theories shed a negative light on sport participation and sport participation may give a

bad academic reputation in some student's eyes, there have been no studies that have found a negative effect of athletic participation on academic achievement.

With the growing research that finds positive effects (small or large) of sport participation on academics, many researchers have now studied the question of "why". Marsh (1993) investigated the school's social climate and its effect on academic achievement. He found that the effect of sport participation on academic ability was more statistically significant in schools that had a stronger social climate. His study also found that sport participation can lead to increased commitment to the school and school values (Marsh, 1993). When a student is committed to the school rules and values, the result may be a more disciplined behavior and higher grades (Fejgin, 1994). Broh (2002) tests three theories as to why sport participation influences academic achievement: Developmental Theory, Leading Crowd Hypothesis, and Social Capital Model. The Developmental Theory states that sport participation develops skills that are consistent with skills students need to succeed academically such as work ethic, respect for authority, and perseverance (Broh, 2002). The Leading Crowd Hypothesis states that participating in a sport results in a higher status with peers and a member of the "leading crowd". "It is argued that by increasing social status, sports participation provides the student-athlete with membership in an academically oriented peer group that, in turn, facilitates higher academic performance" (Broh, 2002; Spreitzer and Pugh, 1973). The Social Capital Model suggests that a person obtains benefits through membership in social networks. When there are strong relationships between parents, students, and teachers, compliance and trust is built. Sports offer opportunities for interaction in the community between parents, students, and teachers and thus, results in a stronger community and compliance to school values (Broh,

2002; Spreitzer and Pugh, 1973). The idea is that the more parents, teachers, and students talk to one another, the more the student feels supported which results in higher academic performance. To conduct his study, Broh (2002) used surveys to examine work ethic, relationships with peers, parents, and teacher, behaviors towards school, and family attitudes of students. He measures sport participation as either participated or did not participate and also looks at other clubs such as drama and student council. He used achievement tests in math, science, reading, and history to measure academic success. Verifying the Developmental Theory, he found that participation in a sport does assist in building character which aids in academic achievement. He found that “only a small part of the positive effect of sport participation on grades and test scores is attributed to academic orientation of athletes’ peer groups” (Broh, 2002), resulting in a weak link to the Leading Crowd Hypothesis. Finally, he found the Social Capital Model to have a positive effect between sport participation and academic success. He found that participating in a sport created stronger social ties between student and parents, students and the school, parents and the school, and parents and other parents. Overall, Broh (2002) found athletic participation to have a positive effect on student success.

Many studies have found a positive relationship between sport participation and academic success (see Broh, 2002; Fejgin, 1994; Im et. all, 2016; Marsh, 1993; McNeal, 1995). The question that still needs to be further investigated in the “why”. This current study seeks to fill this gap by adding the type of motivation a student tends to exhibit and the type of sport they play as variables to see if they have an effect on academic success. Current research that investigate sport participation and academic success measure sport participation in different

ways such as by using “sport” as one entire extracurricular activity (Marsh 1993, McNeal 1995), by using subgroups such as junior varsity participation, varsity participation, and intramural participation (Fejgin, 1994; Broh 2002), or by using each specific sport, like basketball or volleyball (Bowen and Greene, 2012; Im et. all, 2016). This current study will look at sport participation in a different way by categorizing sport activity as either participated in a team sport, individual sport, both or none. The type of motivation (intrinsic, extrinsic, or amotivation) that is acquired from playing either team sport, individual sport, both, or none will be used as a variable to find the relationship between sport and academic success. Ryan and Deci’s (2000) “Self-Determination Theory” gives insight to the characteristics that are created when someone is more intrinsically motivated, extrinsically motivated, or not motivated.

### **The Self-Determination Theory**

“It can be said that motivation is a premise in the emergence of any effort. The direction and intensity of effort are related to motivation” (Kucukibis and Gul, 2019). One of the best characteristics of human nature is the drive humans have to be proactive, curious, master new skills, and to apply their talents to the fullest (Ryan and Deci, 2000). The effort that humans put forward to accomplish goals is related to the type of motivation they exhibit (Kucukibis and Gul, 2019). However, Lepper, Corpus, and Iyengar (2005) found that as children age, intrinsic motivation diminishes. Ryan and Deci (2000) give better insight to the type of motivation that exists and the characteristics that comes with those different types in their “Self-Determination Theory”.

The Self-Determination Theory (SDT) investigates and offers an approach to motivation by examining people's growth tendencies and physiological needs (Ryan and Deci, 2000). Ryan and Deci explain there are three needs that are essential for healthy human growth, social development, well-being, and developing motivation: competence, relatedness, and autonomy. Humans by nature are driven by either internal or external factors. They will strive for a goal either because of internal excitement and values or because of external coercion. Ryan and Deci focus on three types of motivation: 1) amotivation: having no motivation (Lexico Dictionaries), 2) extrinsic motivation: completing a task for external incentives (Cherry, 2020), and 3) intrinsic motivation: completing a task purely out of self-interest and self-reward (Cherry, 2019). An important part of the Self-Determination Theory (SDT) is to identify the type of motivation a person exhibits at a given time and the kinds of effects having such motivation has on the situation (Ryan and Deci, 2000). Ryan and Deci (2000) propose two sub theories that help explain the types of motivation in humans: Cognitive Evaluation Theory (CET) and Organismic Integration Theory (OIT).

Intrinsic motivation is responsible for people completing a task out of interest and enjoyment. It is the most powerful motivation as it "represents a principal source of enjoyment and vitality throughout life" (Ryan and Deci, 2000). The Cognitive Evaluation Theory (CET) focuses on the factors that support or diminish intrinsic motivation. When one feels they can be successful at a task and feels they have the freedom to choose to do the task, they are more likely to exhibit intrinsic motivation. In other words, when autonomy and competence are strategically paired together, intrinsic motivation is supported (Ryan and Deci, 2000). Ryan and Deci (2000) report that external rewards, punishments, or pressures to complete a task

diminish intrinsic motivation. In order to fully understand intrinsic motivation, one must begin to look into all types of motivation.

Ryan and Deci (2000) introduce another sub theory to SDT called The Organismic Integration Theory (OIT), that details the different forms of motivation and the behaviors that come from each type. They created a continuum to rank the types of motivation that encourage the most self-determined behaviors to the types of motivation that encourage the least self-determined behaviors (see Figure 1). On the most left side of the continuum and considered to support the most self-determined behavior is intrinsic motivation. On the most right side of the continuum and considered to exhibit the behavior of non-self-determination is amotivation. Amotivation may be in response to one not feeling competent, thinking an activity is invaluable, or not expecting a desirable outcome (Ryan and Deci, 2000). On the continuum, between amotivation and intrinsic motivation is extrinsic motivation. Ryan and Deci (2000) break down extrinsic motivation into four subcategories: external regulation, introjected regulation, identified regulation, integrated regulation. External regulation deals with one being motivated by pure external rewards and demands. It is highly contrasted with intrinsic motivation. This is because when a person is exhibiting external regulation, they are not completing a task out of autonomy, but because they feel the need to obtain the external reward or to escape from a punishment. Introjected regulation is when one accomplishes a task to enhance their ego or worth and avoid guilt (Ryan and Deci, 2000). Identified regulation takes a step towards autonomous behavior as it describes one completing the task because one feels the task is important to accomplish one's own personal goals (Anderson, 2019). Finally, integrated motivation is the closest to intrinsic motivation. Integrated motivation is when one

completes a task because of the feeling that the task aligns with one's self-beliefs, values, or needs (Anderson, 2019; Ryan and Deci, 2000).

Ryan and Deci (2000) found that environments supportive of autonomy and competence promote intrinsic motivation, self-regulated behavior, and healthy human growth. They propose one more behavior that is important to promoting intrinsic motivation: relatedness. People are more likely to adopt behaviors when they see such behaviors being promoted or supported by those they feel closest too. Thus, the feeling of belonging plays an important role in motivation to complete a task. Social groups that one feels connected too that promote autonomy and competence enhances engagement, internalization, and positive motivation (Ryan and Deci, 2000). An example of a huge social group in high schools today are sports teams. It is important to examine the research behind the type of motivation a person belonging to a sport group exhibit. With Ryan and Deci (2000) promoting intrinsic motivation and motivation that is closest to intrinsic motivation, it is also important to examine studies of how type of motivation is related to academic success. The research now turns to studies that have been conducted on type of sport (team sport or individual sport) vs. type of motivation (intrinsic, extrinsic, or amotivation) and type of motivation vs. academic success.

### **Type of Sport vs. Type of Motivation and Academic Success vs. Type of Motivation**

Motivation at its finest is what changes the way people perceive and are willing to accomplish a task. It is what keeps one persevering despite challenges and difficulties that arise. The three most commonly known types of motivation are intrinsic motivation, extrinsic motivation, and amotivation. Intrinsic motivation refers to “behavior that is driven by internal



rewards" (Cherry, 2019), extrinsic motivation refers to "behavior that is driven by external rewards such as money, fame, grades, and praise" (Cherry, 2021), and amotivation refers to "lacking motivation, purpose, or direction" (Lexico Dictionaries). Athletics play a role in almost 8 million student's lives across the United States (NFHS, 2021), thus it is of interest to research the relationship between type of motivation and type of sport a student plays: team sport or individual sport.

Kucukibis and Gul (2019) conducted a study to find the type of motivation a student exhibits when participating in a team sport or individual sport. They surveyed student athletes playing either a team sport or individual sport from ages 14 to 18. The survey consisted of 28 questions that consisted of items that pertained to extrinsic motivation, intrinsic motivation, and amotivation. They first ran t-tests to find if there is a difference in mean scores between team sport and individual sport when it comes to intrinsic motivation, extrinsic motivation, or amotivation. The only significant mean difference between team sport and individual sport was found for amotivation. No significant mean difference for team and individual sport was found for extrinsic motivation or intrinsic motivation. Further testing revealed that the motivation dimensions for students doing team sports were mainly related to intrinsic motivation. Similarly, the motivation dimensions for students doing individual sports were mainly related to intrinsic motivation (Kucukibis and Gul, 2019).

Jakobsen (2014) conducted a similar study to find if there are differences in motives between students' participation in team sports or individual sports. He surveyed 78 athletes who played four different sports: handball, soccer, gymnastics, and track and field. The survey consisted of 30 items that evaluated five different motives for participating in sports: fitness,

appearance, competence, social, and interest/enjoyment. He found that athletes who participated in both team and individual sports had high scores in interest/enjoyment and competence, which are intrinsic motives. He also found that athletes who participated in both team and individual sports had high scores in fitness, which is an extrinsic motive. Results also showed that those participating in a team sport had higher scores in interest/enjoyment and competence than those in individual sports. In summary, his results show that those in team sport and individual sport scored high in the intrinsic motives category, but scored the highest in one of the extrinsic motive categories: fitness. He found support that intrinsic or extrinsic motivation has a relationship with playing a team or individual sport (Jakobsen, 2014).

Studies have shown that there are not big differences between intrinsic and extrinsic motivation and sport category (team or individual) (see Toktas and Bas, 2019; Jakobsen, 2014; Kucukibis and Gul, 2019). However, it can be seen that motivation overall plays a role in an athlete's decision to play a sport and their self-confidence. Sari, Ekici, Soyer, and Eskiler (2015) found that intrinsic and extrinsic motivation are positively correlated with self-confidence. The type of sport an athlete participates in may not show large differences in types of motivation, but it has been shown that students who participate in sports have higher levels of confidence which correlate to higher levels of motivation (Arslan et. all, 2015; Sari et. all, 2015). Šmela, Pačesová, Kraček, & Hájovský (2017) conducted a study to find the difference in performance motives between elite athletes, recreational athletes, and non-athletes. They defined performance motives to consist of four aspects: "the aspect of performance behavior, the aspiration aspect, the aspect of endurance at work, the aspect of time orientation in the future". In their results they found that those who are either elite athletes or recreational

athletes have statistically significant higher levels of performance motives than non-athletes. They conclude that “sport activity can be considered as one of the factors influencing the motivation to perform” (Šmela et. all, 2017). It has been concluded that motivation plays a role in athletics and athletics plays a role in having higher levels of motivation. Since all students in the United States participate in academic activities, it is also important to examine studies that find relationships between type or motivation and academic success.

No matter the level of intelligence of a student, they are bound to face difficulties in their academics. One way to get through these difficulties is through seeking and asking for help. Studies have shown that asking for help is positively correlated with higher academic performance (see Willams and Takaku, 2011; Karabenick, 2003). Algharaibeh (2020) conducted a study to find the relationship between GPA, type of motivation, and help seeking students. Three of the types of help seeking variables in Algharaibeh’s study are instrumental help-seeking, executive help seeking, and avoidant help seeking (Algharaibeh, 2020). Avoidant help seeking is when students know they need help but avoid asking questions (Ryan et. all, 2001). Executive help seeking is when students ask for help just to “get the job done” and are not interested in the learning of the material (Nelson-Le Gall, 1981). Instrumental help seeking is when students seek the help necessary to learn and complete the tasks successfully to increase their overall learning (Nelson-Le Gall, 1981). Algharaibeh (2020) surveyed 437 students on their motivation type (intrinsic, extrinsic, or amotivation) and the type of help seeking they exhibit when facing difficulties. The study found a statistically significant direct positive effect of instrumental help seeking to GPA and a statistically significant direct positive effect of intrinsic motivation to instrumental help seeking. Thus, the study states they found an indirect positive

effect of intrinsic motivation to GPA. Conversely, the study found a direct negative effect of amotivation to executive help seeking and a direct negative effect from executive help seeking to GPA. Thus, the study found a negative indirect effect of amotivation and GPA. The study also found a statistically significant positive correlation between intrinsic motivation and extrinsic motivation. The study explains the reason for this correlation being that both types of motivation aim for the same result: academic success. This study gives reason to conclude that higher levels of motivation can lead to more academic success. "Students who have high internal motivation are aware of the benefits of seeking help.... All this pushes them towards seeking the necessary help from others for achievement and perfection" (Algharaibeh, 2020).

Algharaibeh (2020) found differences in amotivation and intrinsic motivation in their relationship to academic success. Research turns to a study that compares extrinsic motivation and intrinsic motivation to academic success. Lepper, Corpus, and Iyengar (2005) found differences in extrinsic motivation and intrinsic motivation in their relationship to academic success. They found that intrinsic motivation has a positive relationship with academic performance and standardized test scores. A slightly more interesting result is the finding of a negative relationship of extrinsic motivation with academic performance and standardized test scores. When they compared intrinsic motivation to extrinsic motivation, they found a statistically significant negative correlation. However, the negative correlation was only moderate ( $r=-.24$ ) and the effect only explained 6% of the variance. They suggest that intrinsic and extrinsic motivation should not be viewed as polar opposites, where if you have one type of motivation, it works against the other. Rather, their findings suggest that the more educators

can enhance intrinsic motivation, the better it will be to maximize a student's academic motivation.

Vansteenkiste, Simons, Lens, Sheldon, and Deci (2004) enhances the theme that intrinsic motivation has a positive relationship with academic success. They make the claim that the high levels of engaged learning take place when intrinsic motivation is paired with an autonomous-supportive environment where students “feel free to decide for themselves to learn rather than being forced to do so” (Vansteenkiste et. all, 2004). Another study finds that students who are considered “gifted” academically have high levels of intrinsic motivation (Gottfreid et. all, 2005).

In conclusion, there have been studies that have shown that motivation has a relationship with the type of sport and motivation has an effect on academic success. The gap found in this research is the link between these two types of studies. The current study seeks to find a relationship between studies of type of sport vs. type of motivation and type of motivation vs. academic success, ultimately answering the question: Is participating in a sport predictive of academic success?

## **Conclusion**

Chapter 2 gave an overview of the research that has been conducted on the relationship between sports and academics, sports and motivation, and motivation and academics. The research finds that sports have no negative effects on academics, sport participation is affiliated with higher levels of motivation, and academic success is affiliated with higher levels of motivation.

Chapter 3 will discuss the current study's procedures and Chapter 4 will discuss the current study's results. Finally, Chapter 5 will include the study's conclusions and relatedness with the current research.

## **CHAPTER III: METHODOLOGY**

### **Introduction**

This study is focusing on the relationship between student motivation, type of sport, and student's academic success. This chapter will focus on the methodology of this study. The following chapter will give an overview of where the study will take place, who will participate in the study, and the instruments and procedures that will be conducted to complete the study.

### **Setting and Participants**

The study will take place at Lutheran West High School in Rocky River, OH. The school is located in the west suburbs of Cleveland, Ohio and is a private high school ranging from 9<sup>th</sup> to 12<sup>th</sup> grade. There are 500 total students that attend the school. All students with permission from a parent or guardian were approved to participate in the study.

Due to the location and type of school, this study should be generalized with caution. The sample was taken from a small, private, suburban high school and results should only be interpreted for schools of the same type. It is also important to note that the sample will be taken from the 2020-2021 school year. During the 2020-2021, due to the COVID-19 pandemic, in person instruction was offered for almost the full school year, but students were given an option to receive online instruction. Families could make the decision to have their student partake in the online option on a daily basis. This means that a student could be in school one day and then be online the next. In the two weeks between Thanksgiving and Christmas, the school only offered online instruction. This unique way the students received instruction a

threat to the generalizing of this study. Results should not be generalized to a typical school year where all students received in person instruction for the entire year.

The desired sample size to obtain adequate statistical power of .95 for the multiple linear regression tests that will be run is 119 participants (Faul et. all, 2007). However, a principal component analysis (PCA) will be conducted for this study and appropriate sample sizes for this technique is needed. Field, Miles, and Field (2012) in their book, "Discovering Statistics Using R", state that to run an effective PCA and use factor loadings in a regression model a sample size of 10-15 participants per variable is needed. A sample size of 300 is needed to run the PCA and the sample size will be reassessed once the number of components emerge (Field et. all, 2012).

### **Instrumentation**

The study examined types of motivation exhibited in the classroom. The type of motivation a student exhibits will be found by conducting student surveys and teacher surveys. The student surveys will be used to calculate student intrinsic motivation scores, extrinsic motivation scores, and amotivation scores. These scores will show the level of each type of motivation the student exhibits in the classroom as perceived by the students themselves. Scores will be obtained by having each student take a motivation survey. Academic Motivation Scale (AMS) (see Appendix C) will be used as the student motivation survey. The Academic Motivation Scale is a survey consisting of 28 statements that students' rate on a 7-point Likert scale (1 – does not correspond at all to 7 – corresponds exactly) (Vallerand et. all, 1992). The statements of the survey are statements that correspond to why a student, in his or her



opinion, attends school. Examples of these statement include “Because I need a high school degree in order to find a high paying job later on”, “Because for me, school is fun”, and “I can’t see why I go to school and frankly, I couldn’t care less”. The AMS was created by translating the Échelle de motivation en éducation (EME) from French to English. The EME is a scale developed to assess three types of motivation (intrinsic, extrinsic, and amotivation). Robert Vallerand, Luc Pelletier, Marc Blais, Nathalie Briere, Caroline Senecal, and Evelyn Vallieres (1992) tested the validity and reliability of the AMS in their study, “The Academic Motivation Scale: A Measure of Intrinsic, Extrinsic, and Amotivation in Education". They conducted their research by having college students fill out the AMS and then running tests on the results (Vallerand et. all, 1992). Vallerand, Pelletier, Blais, Briere, Senecal, and Vallieres verified the AMS with an average Cronbach’s Alpha score of .81. They conclude that the AMS is a reliable and valid scale and is a “useful tool in motivation research in educational settings" (Vallerand et. all, 1992).

Another way the study will measure student motivation is by teacher surveys. The teacher surveys will be used to obtain an overall student motivation score as perceived by the teacher. A subscale of the Academic Competence Evaluation Scales (ACES) (see Appendix D) will be used for the teacher survey. Dr. James C Diperna and Stephen N. Elliot developed the Academic Competence Evaluation Scale to measure the skills, attitudes, and behaviors that contribute to a student's academic success. They developed two scales of the ACES: Academic Skills and Academic Enablers. The ACES Academic Skills scale measures a student's competence in both basic and complex skills in subjects such as math, reading and critical thinking. The ACES Academic Enabler scale measures students’ social skills, study skills, motivation, and engagement in the classroom (Smith, 2015). The current study will use the ACES Academic

Enabler scale to find students' motivation and engagement in the classroom. Because the study will only use the ACES Academic Enablers portion, only the validity of this scale is reported. DiPerna and Elliot tested the validity of the ACES-Academic Enabler scale by conducting the survey and finding Cronbach alpha scores across four grade groups (K-2<sup>nd</sup>, 3<sup>rd</sup>-5<sup>th</sup>, 6<sup>th</sup>-8<sup>th</sup>, and 9<sup>th</sup> – 12<sup>th</sup>) (as cited in Smith, 2015). This study will use participants in the 9<sup>th</sup> - 12<sup>th</sup> group and the Cronbach alpha score for this group, found by DiPerna and Elliot, is .99 (as cited in Smith, 2015). ACES Academic Enabler Scale consists of 40 statements that teachers rank on a 5-point Likert scale of how often students exhibit the behavior in the classroom (1 – Never to 5 – Almost Always) (Smith, 2015; The Psychological Corporation, 2001). The statements of this survey measure the academic behaviors of students in the classroom of social skills, study skills, motivation, and engagement. Examples of these statements are “perseveres with challenging tasks” and “is focused on the goal”. Because of the limited resources in obtaining the survey, only 27 of the 40 statements in the ACES are used in this study. These 27 statements were found in a study conducted by Taryn Smith in which she uses the survey to validate and compare to other scales that measure academic behaviors (Smith, 2015).

## **Procedure**

There are five variables for which data will be collected: student GPAs, type of sport, grade level, AMS survey scores, and ACES survey scores. The following sections will give an overview of how data for each variable will be collected.

Type of sport in which a student participates (team, individual, both, or none) will be collected from Lutheran West High School's databases. The type of sport a student plays will be

taken from the fall, winter, and spring sport seasons. Students who play individual sports only will be coded as “INDIVIDUAL”. Students who play team sports only will be coded as “TEAM”. Students who do not play a sport will be coded as “NONE”. Students who play both a team sport and an individual sport will be coded as “BOTH”. A list of sports and its considered sport type for this study is given in Table 1.

**Table 1.**  
*List of Sports and Considered Sport Type.*

Team	Individual
Football	Wrestling
Volleyball	Track and Field
Soccer	Bowling
Basketball	Golf
Cheerleading	Cross Country
Baseball	
Softball	

Student GPAs and grade level will be collected through Renweb, the database Lutheran West High School uses as a grading system. Student final grades at Lutheran West are calculated at the end of each semester. Thus, student GPAs at Lutheran West High School are affected by first semester final grades and second semester final grades. Because of the timing in which data will be collected, second semester final grades will not have been completed. Therefore, the GPAs collected for this study will only have been affected by first semester grades in the school year of 2020-2021. GPAs are cumulative throughout the student's time at Lutheran West. Thus, a senior's GPA will be calculated from their seven semesters they

completed when data is collected, while a freshman's GPA will have been calculated from their one semester they completed when the data is collected.

The AMS survey scores will be collected through Google Forms. The AMS will be converted into a Google Form and will be given to students in their theology classes. The researcher will send the theology teachers the Google Form link and the theology teachers will post the link in their Google Classrooms for students to take in class on February 2, 2021. All students at Lutheran West have to take a theology class. Thus, having the theology teachers administer the surveys in their classroom ensures that all students allowed to participate in the study will take the survey. To participate in this study, students were required to have permission from a student or guardian. Students were also given the opportunity to opt out of the study. The study, its purpose, and the student data that will be used was fully explained to all student's parents and guardians (see Appendix B). The data collected from each student by means of the Google Form will then be converted into Excel spreadsheet for analyzing.

The ACES survey scores will be collected by having the teachers of the math department at Lutheran West High School fill out the 27 question ACES Academic Enabler scale for each of their students. Since all students have to take a math class at Lutheran West High School, asking the math department to fill out surveys on each student ensures that a survey is filled out for all students who have permission to partake in the study. The math teachers will sign a consent form to partake in the study before they fill out the surveys (see Appendix A). The ACES Academic Enabler Scale will be administered through a paper handout. The ACES Academic Enabler Scale will be given to teachers to be filled out for each of student

participants. The teachers will complete one survey per each of their students. The data collected from each teacher entered into an Excel spreadsheet for data analysis.

Student and teacher confidentiality are of the utmost importance in this study and steps to ensure student confidentiality will be taken. The collected and compiled data will only identify students by their individual student ID numbers and no names will be collected. Identification of students or teachers participating in the study will not be available during or after the study. All collected data in the form of Excel spreadsheets and Google Forms will be saved on the researchers secured computer. Only the researcher will see and work with the data. In the final report, data will be reported anonymously with no student identifying factors.

### **Data Processing and Analysis**

In this study, there is one primary research question and 8 secondary research questions:

- Primary Research Question: Is participating in a team sport, individual sport, both, or no sport and a student's motivation (intrinsic, extrinsic, or amotivation) predictive of a student's academic success?
- Secondary Research Questions #1: Is there a significant difference in intrinsic motivation scores and type of sport?
- Secondary Research Questions #2: Is there a significant difference in extrinsic motivation scores and type of sport?

- Secondary Research Questions #3: Is there a significant difference in amotivation scores and type of sport?
- Secondary Research Questions #4: Is there a significant difference in student GPA and type of sport?
- Secondary Research Question #5: Is there a difference in teacher perceived motivation scores and type of sport?
- Secondary Research Questions #6: Is there a relationship between teacher perceived motivation score and student intrinsic, extrinsic, or amotivation scores?
- Secondary Research Questions #7: Is there a relationship between teacher perceived motivation score and student GPA?
- Secondary Research Questions #8: Is a student's motivation, as perceived by the teacher, and type of sport predictive of a student's academic success?

This section will describe the statistical tests, techniques, and methods that will be used to process the data and give an answer to the research questions.

Data will be compiled into an Excel spreadsheet and will be categorized by the different variables of the study: student ID, student grade level, type of sport, GPA, student survey responses from AMS, and teacher survey response from ACES Academic Enabler Scale. All statistical tests will be conducted using the statistical package, R (R Core Team, 2020). The first statistical test that will be run is a principal component analysis (PCA) on the student survey

responses. The researcher will interpret the factor loadings from the test and find factor components and factor scores that correspond to a student's motivation towards school. A study by Vallerand, Pelletier, Blais, Briere, Senecal, and Vallieres conducted a PCA on the AMS using college students. They found factor loadings that created factor components such as "amotivation", "extrinsic motivation", and "intrinsic motivation" (Vallerand et al., 1992). The current study seeks to examine factor scores for amotivation, intrinsic motivation, and extrinsic motivation for each student. If a factor structure evolves, factor scores will be created and used in future analyses.

DiPerna and Elliot conducted PCA on the ACES – Academic Enabler scale (as cited in Smith, 2015). They found factor loadings that created factor components of interpersonal skills, classroom engagement, academic motivation, and study skills (as cited in Smith, 2015). Items 1-3, 6-7, 9, and 15 - 18 of the ACES – Academic Enabler scale are associated with academic motivation (Smith, 2015). Only these items will be used to measure a student's academic motivation as described by the teacher. The item responses will be summed up for each student to create one total academic motivation score. This total academic motivation score will be the teacher perceived motivation score and will be used in future analysis.

Jakobson (2014) conducted a study to determine if there are differences in motives for participation in team sports vs. individual sports. He included a survey to acquire what type of motive a student had for participating in a sport and the type of sport the student participated in (team or individual). He then conducted ANOVA techniques and MANOVA techniques with the responses from the surveys and the type of sport (Jakobson 2014). Toktas and Bas (2019) used surveys to find scores for participants' self-confidence. Toktas and Bas used ANOVA

techniques to determine if there is a difference in type of sport and self-confidence scores (Toktas and Bas, 2019). This study will use similar ANOVA techniques with the AMS responses, the ACES Academic Enabler Scale responses, GPA, and the type of sport in which a student participates.

An ANOVA will be used to test secondary research question #1: “Is there a significant difference in intrinsic motivation scores and type of sport?”. The hypothesis will be “There is no difference between student intrinsic motivation score and type of sport”. The ANOVA will be run across the variables of type of sport (INDIVIDUAL, TEAM, BOTH, or NONE) and the factor score for intrinsic motivation created from the factor analysis on the AMS. A Tukey Post-Hoc Test will then be run for the ANOVA to either verify non-statistically significance, or to further determine why the ANOVA test was statistically significant.

An ANOVA will be used to test secondary research question #2: “Is there a significant difference in extrinsic motivation scores and type of sport?”. The hypothesis will be “There is no difference between student extrinsic motivation score and type of sport”. The ANOVA will be run across the variables of type of sport (INDIVIDUAL, TEAM, BOTH, or NONE) and the factor score for extrinsic motivation created from the factor analysis on the AMS. A Tukey Post-Hoc Test will then be run for the ANOVA to either verify non-statistically significance, or to further determine why the ANOVA test was statistically significant.

Similarly, an ANOVA will be used to test secondary research question #3: “Is there a significant difference in amotivation scores and type of sport?”. The hypothesis will be “There is no difference between student amotivation score and type of sport”. The ANOVA will be run across the variables of type of sport (INDIVIDUAL, TEAM, BOTH, or NONE) and the factor score



for amotivation created from the factor analysis on the AMS. A Tukey Post-Hoc Test will then be run for the ANOVA to either verify non-statistically significance, or to further determine why the ANOVA test was statistically significant.

ANOVA techniques will be used to test secondary research question #4: “Is there a significant difference in student GPA and type of sport?”. The hypothesis will be “There is no difference between student GPA and type of sport”. The ANOVA will be run across the variables of type of sport (INDIVIDUAL, TEAM, BOTH, or NONE) and the GPA of each student. A Tukey Post-Hoc Test will then be run for the ANOVA to either verify non-statistically significance, or to further determine why the ANOVA test was statistically significant.

ANOVA techniques will be used to test a secondary research question #5: “Is there a difference in teacher perceived motivation scores and type of sport?”. The hypothesis will be “There is no difference between teacher perceived motivation scores and type of sport”. The ANOVA will be run across the variables of type of sport (INDIVIDUAL, TEAM, BOTH, or NONE) and the academic motivation scores described by the teacher. A Tukey Post-Hoc Test will then be run for each ANOVA to either verify non-statistically significance, or to further determine why the ANOVA test was statistically significant.

Karabenick (2003) conducted a study to assess students’ levels of help seeking and motivation. He conducted a survey to measure learning strategies, help seeking threats, and motivation. He conducted correlation tests with the responses from the survey to test the correlations between help seeking threats and motivation (Karabenick, 2003). The current study will use similar techniques to test if there is a correlation between teacher perceived motivation score and student intrinsic, extrinsic, and amotivation scores. Correlation tests will

be conducted to test secondary research questions #6: "Is there a relationship between teacher perceived motivation score and student intrinsic, extrinsic, or amotivation scores?". The hypothesis will be "There is no relationship between teacher perceived motivation score and student intrinsic, extrinsic, or amotivation scores". Three correlation tests will be run to test this hypothesis. One correlation test will be run across the total academic motivation score described by the teacher and the factor score for intrinsic motivation created by the factor analysis on the AMS. The second correlation test will be run across the total academic motivation score described by the teacher and the factor score for extrinsic motivation created by the factor analysis on the AMS. The third correlation test will be run across the total academic motivation score described by the teacher and the factor score for amotivation created by the factor analysis on the AMS.

A correlation test will be conducted to test secondary research questions #7: "Is there a relationship between teacher perceived motivation score and student GPA?". The hypothesis will be "There is no relationship between teacher perceived motivation score and student GPA". The correlation test will be run across the total academic motivation score described by the teacher and student GPA.

Multiple regression techniques will be used to test secondary research questions #8 and the primary research question. Jakobsen (2014) in his study on differences in motives between participating in an individual sport compared to team sports, used a hierarchical regression analysis to "examine how extrinsic and intrinsic motives predict the variables of team or individual sport". Fejgin (1994) also used multiple regression techniques to examine the relationship between sport participation and academic success and aspirations. This study will

use similar regression techniques to find if type of motivation and type of sport predicts academic success (measured by student GPA).

Secondary research question #8: "Is a student's motivation, as perceived by the teacher, and type of sport predictive of a student's academic success?" will be addressed using multiple linear regression techniques. The dependent variable will be student GPA and the independent variables will be teacher motivation score and type of sport (TEAM, INDIVIDUAL, BOTH, or NONE). Type of sport will be put into dummy variables to compare TEAM sport with all other sport type categories (INDIVIDUAL, BOTH, or NONE). After the model is created, an ANOVA will be conducted to test the significance of the model. A hat matrix will be created for the model and a Cook's Distance will be found for each case to find any cases that may have to be eliminated from the model due to high influence. A normal q-q plot will also be created for the model to test normality. Once the model is found, confidence intervals will be given for the beta values of the model.

The primary research question: "Is participating in a team sport, individual sport, both, or no sport and a student's motivation (intrinsic, extrinsic, or amotivation) predictive of a student's academic success?" will be addressed using multiple regression techniques. For the dependent variable of GPA, a multiple linear regression test will be conducted. The multiple linear regression tests will use grade level (Freshman, Sophomore, Junior, Senior), type of sport (TEAM, INDIVIDUAL, BOTH, or NONE), intrinsic factor score, extrinsic factor score, and amotivation factor scores as predictors of GPA. Grade level will be put into dummy variables to compare seniors to all other grade levels. Type of sport will also be put into dummy variables to compare TEAM sport with all other sport type categories (INDIVIDUAL, BOTH, or NONE).

After the model is created, an ANOVA will be conducted and the AIC value will be found for the model to test the significance of the model. A backward elimination will be conducted to test if any predictors can be eliminated to create a better model. A hat matrix will be created for the model and a Cook's Distance will be found for each case to find any cases that may have to be eliminated from the model due to high influence. A normal q-q plot will also be created for the model to test normality. Once the best model is found, confidence intervals will be given for the beta values of the model.

### **Summary**

To answer the primary question of this study “Is participating in a team sport, individual sport, both, or no sport and a student’s motivation (intrinsic or extrinsic) predictive of a student’s academic success?”, data will be taken from Lutheran West High School and many different statistical tests will be used such as ANOVA, correlation tests, and multilinear regression. In Chapter 4, the data will be organized and the tests will be conducted to find answers to the hypotheses of the study. Chapter 4 will present the statistical analyses for this study. In chapter 5, the final conclusions for the study will be presented.

## CHAPTER IV: RESULTS

### Introduction

In this chapter, the data is analyzed using statistical techniques and the results are discussed. The purpose of this study is to determine if a student's level of motivation, type of motivation, and type of sport is predictive of academic success. Student GPA, type of sport (individual, team, both, or none), and grade level were collected. Students filled out the AMS to determine the students' type of motivation (intrinsic, extrinsic, or amotivation). Teachers filled out the ACES – Academic Enabler scale to determine the level of motivation a student has in the classroom in the opinion of the teacher.

### Study Participants

Students from Lutheran West High School were asked to participate in the study. Permission was obtained from legal guardians of students and students were given an option to opt out. 493 students at Lutheran West High School were allowed to participate in the study. The AMS (see Appendix C) was planned to be given to the 493 students by means of a Google Form to determine the type of motivation students exhibit. Due to student absences on the day the survey was conducted, 445 student surveys were collected and analyzed in Excel for missing data or repeat student ID numbers. Surveys that had missing data or repeated student IDs were omitted leaving 389 viable student AMS surveys to be used for the study. Grade Level, Sport Type (individual, team, both, or none), and GPA was collected for each student and paired with the 389 survey responses in Excel. A sample size of greater than 300 was obtained based on the G\*power results and the sample size needed to conduct a factor analysis (Faul et. all, 2007; Field et. all, 2012). The ACES – Academic Enabler scale (see Appendix D) was given to the

math teachers at the school to be filled out to determine each student’s level of academic motivation in the opinion of the teacher. Teachers signed a consent form before filling out surveys (see Appendix A). 429 surveys were collected from the teachers and then analyzed in Excel for missing data or repeated student ID numbers. Surveys that had missing data or repeated student IDs were omitted leaving 410 viable teacher ACES Academic Enabler Scale surveys to be used for the study.

**Descriptives**

A sample size of 389 students was obtained and descriptives of each student’s GPA, grade level, and sport type was collected. The breakdown for the participant grade level were as follows: 114 freshmen (29.3%), 84 sophomores (21.6%), 92 juniors (23.7%), and 99 seniors (25.4%). The breakdown for participant sport type were as follows: 45 participants participated in only an individual sport (11.6%), 143 participants participated in only a team sport (36.8%), 31 participants participated in both team and individual sports (8.0%), and 170 participants did not participate in any sports (43.7%). The mean and standard deviations of students’ GPA by grade level is given in Table 2.

**Table 2.**  
*Mean and Standard Deviations of Student GPA by Grade Level*

<b>Grade Level</b>	<b>Mean</b>	<b>SD</b>
Freshman (n = 114)	2.99	0.87
Sophomore (n = 84)	2.87	0.82
Junior (n = 92)	3.07	0.69
Senior (n = 99)	3.09	0.69

The mean and standard deviations of students’ GPA by sport type is given in Table 3.

**Table 3.**

*Mean and Standard Deviations of Student GPA by Sport*

<b>Sport Type</b>	<b>Mean</b>	<b>SD</b>
Individual (n = 45)	3.20	0.70
Team (n = 143)	3.01	0.74
Both (n = 31)	3.02	0.74
None (n = 170)	2.95	0.83

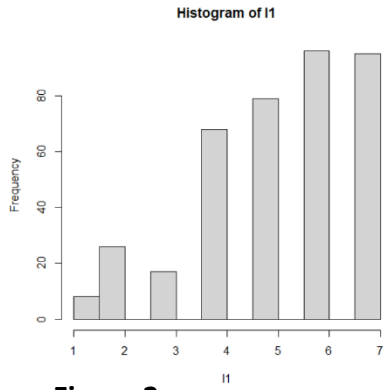
### **Academic Motivation Scale Survey Responses and Principal Components Analysis**

The Academic Motivation Scale (AMS) was given to 445 students at Lutheran West High School to determine each student's level of each type of motivation: intrinsic, extrinsic, and amotivation. The survey responses were analyzed in Excel for missing data. The missing data found was omitted leaving 389 student surveys for a Principal Component Analysis (PCA). The AMS survey consisted of 28 statements on reasons students attended school and responses were submitted on a 7-point Likert scale. An example item is "Because for me, school is fun". Responses ranged from 1 = does not correspond at all, 4 = corresponds moderately, and 7 = corresponds exactly. All questions involving reasons why students attend school were posed such that a response of "7" indicated a strong positive reason to attend school, except for questions #5, #12, #19 and #26. Before data analysis, responses for questions #5, #12, #19 and #26 were flipped such that 7 = 1, 6 = 2, 5 = 3, 4 = 4, 3 = 5, 2 = 6, and 1 = 7.

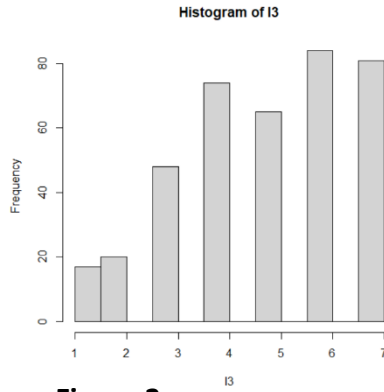
A principal component analysis (PCA) was conducted with the 28 items from the AMS survey with orthogonal (varimax) rotation. Before the PCA was conducted, the preliminaries of sample size, too many high/low correlations, and normality were checked. The minimum amount of data for the PCA was satisfied since the number of cases (n = 389) exceeded 300 (Field et. all, 2012). To investigate if there were not too many low correlations between the

items, Bartlett's test of minimum correlations was conducted on the data. Bartlett's test, ( $\chi^2(378) = 6595.1, p < .001$ ), indicated that the correlations between the items were sufficiently large. To investigate if there were not too many high correlations between the items, the determinant of the correlation matrix was investigated for the data. The determinant of the correlation matrix, 0.000000026, was less than 0.0001, indicating that multicollinearity may be an issue. When investigating the correlation matrix, it was found that item #1 had many low correlations (86% of correlations  $< .30$ ) and item #12 had many low correlations (86% of correlations  $< .30$ ). Items #1 and #12 were initially eliminated from the data resulting in the determinant of the correlation matrix to be 0.000000068. Since eliminating items #1 and #12 did not drastically change the determinant of the correlation matrix, the decision was made to keep items #1 and #12 in the data. It is also noted that in the PCA run on the AMS by Vallerand, Pelletier, Blais, Briere, Senecal, and Vallieres, items #1 and #12 were not eliminated (Vallerand et al., 1992). The determinant of the correlation matrix, 0.000000026, is not above the threshold of 0.0001, it was determined that multicollinearity could be an issue. The histograms of each item were observed and 13 of the 28 items had potential normality issues. Histograms for the 13 items (#1, #3, #4, #5, #8, #10, #11, #12, #15, #19, #22, #25, and #26) are given in Figure 2, Figure 3, Figure 4, Figure 5, Figure 6, Figure 7, Figure 8, Figure 9, Figure 10, Figure 11, Figure 12, Figure 13, and Figure 14 respectively.

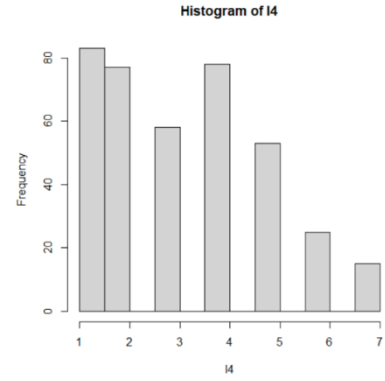




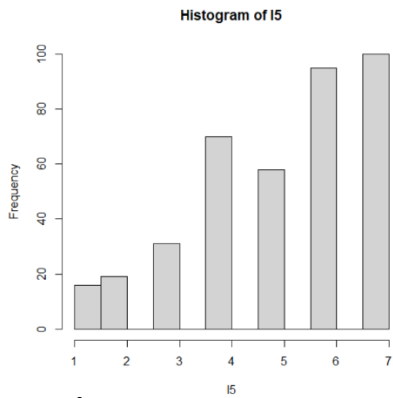
**Figure 2.**



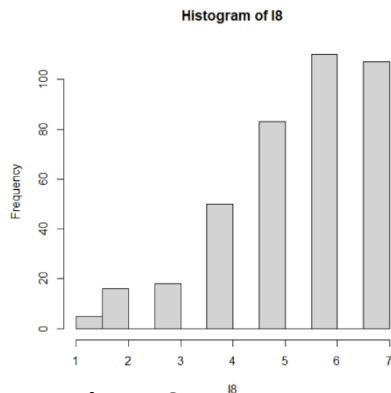
**Figure 3.**



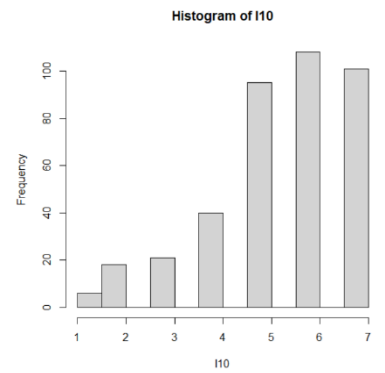
**Figure 4.**



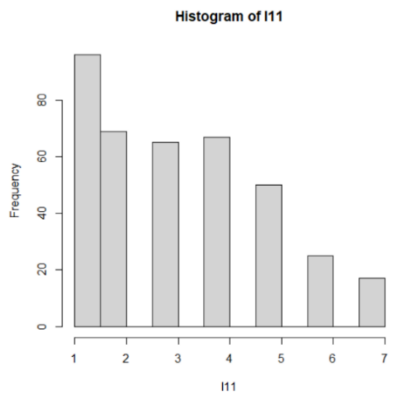
**Figure 5.**



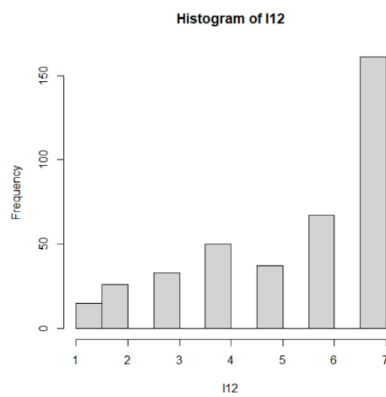
**Figure 6.**



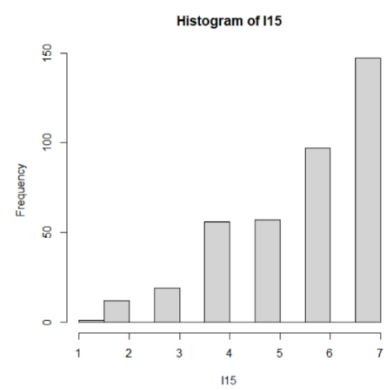
**Figure 7.**



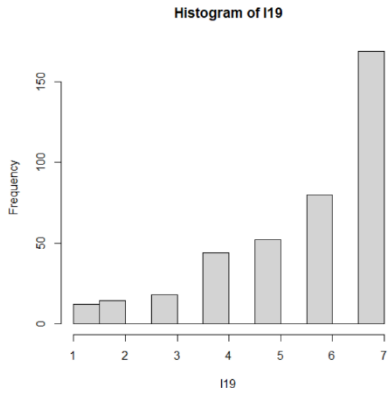
**Figure 8.**



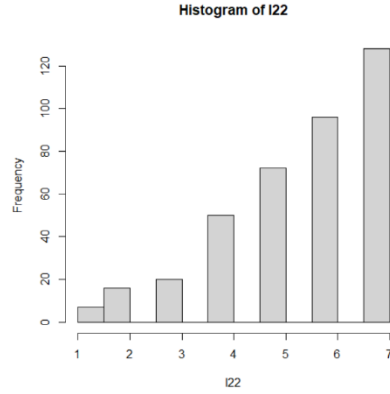
**Figure 9.**



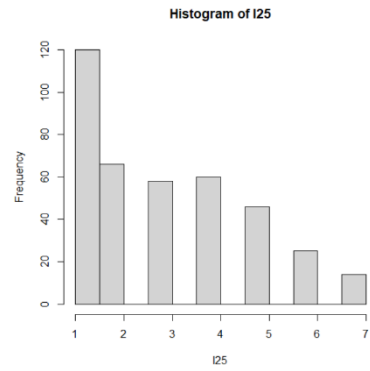
**Figure 10.**



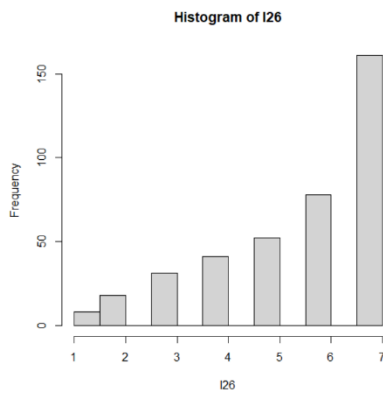
**Figure 11.**



**Figure 12.**



**Figure 13.**



**Figure 14.**

An initial analysis was run to obtain eigenvalues for each component in the data. Four components emerged with eigenvalues over the frequently used criterion of 1. However, the first three components loaded with eigenvalues greater than 2 and had a cumulative variance of 56%. The fourth component loaded with an eigenvalue of 1.49 and only added 8% more to the cumulative variance. The scree plot was examined and showed inflection points that would justify retaining three or four components. The scree plot is shown in Figure 15.

Scree Plot from PCA

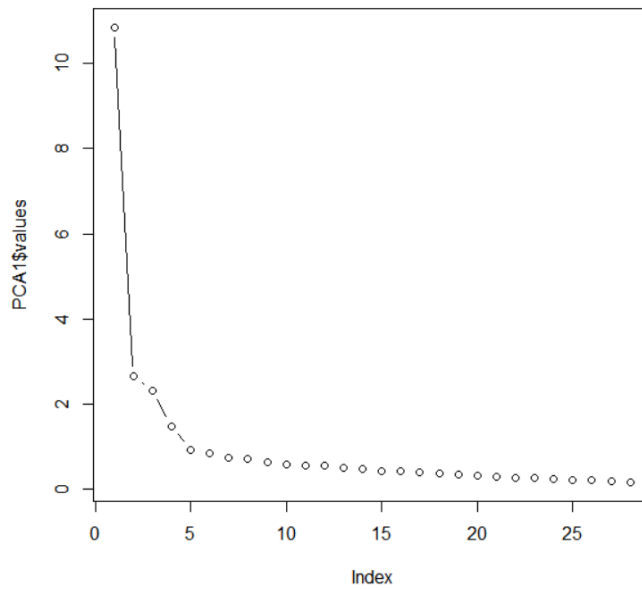
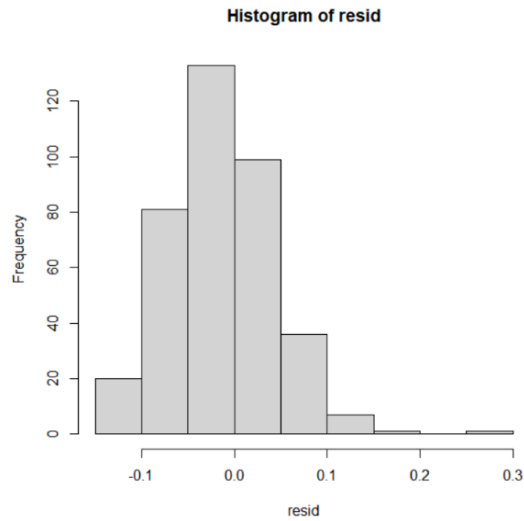


Figure 15.

Due to the test techniques needed for this study, factor loadings are needed for intrinsic, extrinsic, and amotivation scores. Since the difference of a three or four component model is minimal, a three-component model was retained. In combination, the three components explained 56% of the variance. The examination of the residuals indicated that 38.6% of the residuals are below the threshold of 0.05, with root-mean-square equal to 0.06. A histogram of the residuals is presented in Figure 16.



**Figure 16.**

Because of the nature of this study, it is reasonable to assume a potential for high correlations among factors; thus, an oblique rotation was implemented. Factor correlations are presented in Table 4. The same three factors emerged via the oblique rotation, with the exceptions of item #3 not loading onto any component. Since the factor correlations did not raise concern and the differences in the oblique and orthogonal rotations were minimal, the results from the oblique rotation are presented.

**Table 4.**

*Factor Correlations for the PCA after an Oblique Rotation*

	<b>F1</b>	<b>F2</b>	<b>F3</b>
<b>F1</b>	1.00	0.35	0.37
<b>F2</b>		1.00	0.17
<b>F3</b>			1.00

Factor loadings after an oblique rotation are shown in Table 5. Factor loadings under .4 are not shown. The questions/items that clustered on the components suggests that component 1 represents intrinsic motivation, component 2 extrinsic motivation, and component 3 represents amotivation.

**Table 5.***Factor Loadings of the PCA after an Oblique Rotation.*

	<b>Question</b>	<b>C1</b>	<b>C2</b>	<b>C3</b>	<b>h2</b>
I9	For the pleasure I experience when I discover new things never seen before.	0.82	--	--	0.62
I20	For the satisfaction I feel when I am in the process of accomplishing difficult academic activities.	0.79	--	--	0.66
I25	For the "high" feeling that I experience while reading about various interesting subjects.	0.79	--	--	0.55
I27	Because high school allows me to experience a personal satisfaction in my quest for excellence in my studies.	0.77	--	--	0.69
I13	For the pleasure that I experience while I am surpassing myself on one of my personal accomplishments.	0.76	--	--	0.59
I18	For the pleasure that I experience when I am taken by discussions with interesting teachers.	0.74	--	--	0.46
I6	For the pleasure I experience while surpassing myself in my studies	0.74	--	--	0.56
I2	Because I experience pleasure and satisfaction while learning new things.	0.72	--	--	0.59
I23	Because my studies allow me to continue to learn about many things that interest me.	0.70	--	--	0.61
I28	Because I want to show myself that I can succeed in my studies.	0.69	--	--	0.63
I14	Because of the fact that when I succeed in school, I feel important.	0.68	--	--	0.51
I16	For the pleasure that I experience in broadening my knowledge about subjects which appeal to me.	0.67	--	--	0.51
I11	Because for me, school is fun.	0.64	--	--	0.51
I21	To show myself that I am an intelligent person.	0.62	--	--	0.57
I4	Because I really like going to school.	0.60	--	--	0.47
I7	To prove to myself that I am capable of completing my high school degree.	0.55	--	--	0.41
I22	In order to have a better salary later on.	--	0.83	--	0.66
I15	Because I want to have "the good life" late on.	--	0.76	--	0.61
I8	In order to obtain a more prestigious job later on.	--	0.75	--	0.59
I10	Because eventually it will enable me to enter the job market in a field that I like.	--	0.61	--	0.54
I1	Because I need at least a high school diploma to find a high paying job later on.	--	0.61	--	0.34

117	Because this will help me make a better choice regarding my career orientation.	--	0.51	--	0.47
124	Because I believe that my high school education will improve my competence as a worker.	--	0.47	--	0.55
13	Because I think that a high school education will help me better prepare for the career I have chosen	--	--	--	0.46
112	I once had good reasons for going to school; however, now I wonder whether I should continue.	--	--	0.82	0.62
119	I can't see why I go to school and frankly, I couldn't care less.	--	--	0.80	0.72
126	I don't know; I can't understand what I am doing in school.	--	--	0.80	0.64
15	Honestly, I don't know, I really feel that I am wasting my time in school.	--	--	0.73	0.65
<b>Eigenvalues</b>		<b>8.71</b>	<b>3.80</b>	<b>3.31</b>	
<b>Proportion Variance</b>		<b>31%</b>	<b>14%</b>	<b>12%</b>	

- **Factor 1** = Intrinsic Motivation
- **Factor 2** = Extrinsic Motivation
- **Factor 3** = Amotivation

### Reliability Testing and Factor Scores

Reliability and internal consistency were evaluated for the instrument/model retaining three factors. The Cronbach Alphas for each component is given in Table 6.

**Table 6.**

*Reliability Estimates for Intrinsic Motivation, Extrinsic Motivation, and Amotivation Scores*

<b>Factor</b>	<b>Cronbach's alpha</b>	<b>std.alpha</b>	<b>G6(smc)</b>	<b>avg_r</b>	<b>95% CB</b>
<b>Intrinsic Motivation</b>	0.94	0.94	0.95	0.49	(0.93, 0.95)
<b>Extrinsic Motivation</b>	0.83	0.84	0.83	0.42	(0.81, 0.86)
<b>Amotivation</b>	0.85	0.85	0.82	0.59	(0.83, 0.87)

The instrument is reliable in assessing a student's intrinsic motivation, extrinsic motivation, and amotivation at the .7 threshold. The final conclusion was made that the instrument is reliable in assessing three underlying components: a student's intrinsic motivation, extrinsic motivation, and amotivation.

Factor scores for intrinsic motivation, extrinsic motivation, and amotivation were created for each student and were used as the intrinsic motivation, extrinsic motivation, and amotivation variables in the testing of the study's hypotheses.

### **DATA INVOLVING STUDENT ASSESSED MOTIVATION SCORES**

#### **ANOVA Techniques**

ANOVA Techniques were used to test if there is significance in intrinsic motivation scores and type of sport, extrinsic motivation scores and type of sport, amotivation scores and type of sport, and student GPA and type sport. Study hypotheses 2, 3, 4, and 5 were tested using ANOVA techniques. Factor scores for intrinsic motivation, extrinsic motivation, and amotivation were used as the dependent variable in the tests. The mean and standard deviation of the intrinsic, extrinsic, and amotivation scores across each sport are given in Table 7. Student GPA was also used as the dependent variable to test hypothesis 5. The mean and standard deviation of student GPA and each sport is given in Table 3 (see page 53).

**Table 7.**

*Descriptives of Intrinsic, Extrinsic, and Amotivation Scores across each Sport.*

		<b>Sport Type</b>			
		<b>TEAM</b>	<b>INDIVIDUAL</b>	<b>BOTH</b>	<b>NONE</b>
<b>Type of Motivation</b>	<b>Intrinsic Motivation</b>	M = 0.011 SD = 0.948	M = 0.048 SD = 1.088	M = 0.012 SD = 1.126	M = -0.024 SD = 1.002
	<b>Extrinsic Motivation</b>	M = -0.020 SD = 0.998	M = 0.010 SD = 0.993	M = 0.038 SD = 0.809	M = 0.007 SD = 1.042
	<b>Amotivation</b>	M = -0.037 SD = 1.009	M = 0.210 SD = 1.115	M = -0.088 SD = 0.934	M = -0.009 SD = 0.975

**Interpreting the Amotivation Score.** The amotivation factor score was calculated using the PCA on the AMS survey. The items that loaded onto the amotivation component were items #5, #12, #19 and #26. Before the PCA, the responses to these items had to be flipped due

to all other items indicating a strong positive reason to attend school. For this reason, the interpretation of the amotivation factor school should be reversed. The amotivation factor score should be interpreted as the higher the amotivation factor a score means the lower amount of amotivation a student exhibits.

**Hypothesis 2.** Hypothesis 2 stated: There is no difference between student intrinsic motivation score and type of sport. To test this hypothesis, an ANOVA was conducted between type of sport and the intrinsic motivation factor score. Before the ANOVA was conducted, the assumption of equal variances was tested by Levene's Test for Homogeneity of Variances. The test revealed non-statistical significance for intrinsic scores across sport ( $F(3, 385) = 0.981, p = .401$ ). Therefore, the null hypothesis that the scores across sport had equal variances was not rejected and homogeneity of variances was assumed. The assumption of normality was also conducted for the intrinsic scores across sport type by the Shapiro Wilks Test. The test revealed statistical significance ( $W = 0.99, p < .01$ ). To further investigate, Shapiro Wilks test for multivariate normality was conducted. The test revealed non-statistical significance for the intrinsic scores across TEAM ( $W = 0.96, p = .13$ ), BOTH ( $W = 0.97, p = 0.63$ ), and NONE ( $W = 0.99, p = 0.23$ ), but statistical significance for INDIVIDUAL ( $W = .94, p < .05$ ). Thus, the null hypothesis that the intrinsic scores across sport types came from a normal distribution was rejected and normality was assumed to be violated. Studies have shown that F-tests are robust when normality is violated (Blanca et. all, 2017) and there are only small effects on the F-test when there are unequal sample sizes (Harwell et. all, 1992). It has also been shown that if normality is violated, the Kruskal Wallis is a good alternative (Lix et. all, 1996). Since there was a violation in normality and the group sizes are unequal (Individual ( $n = 45$ ), Team ( $n = 143$ ),



Both (n = 31), None (n = 170)), both an ANOVA and Kruskal Wallis Test was conducted (Harwell et. all, 1992, Lix et. all, 1996).

The ANOVA revealed there was a non-statistical difference between mean intrinsic scores and type of sport ( $F(3,385) = 0.075$ ,  $p = .973$ ,  $\text{cohen-}f = 0.024$ , with an achieved post hoc power of .063). Thus, the null hypothesis that there is no difference between student intrinsic motivation score and type of sport was not rejected. An ANOVA table for the ANOVA between intrinsic motivation scores and type of sport is given in Table 8.

**Table 8.**  
*ANOVA Table for Intrinsic Scores and Type of Sport*

	<b>df</b>	<b>Sum Sq</b>	<b>Mean Sq</b>	<b>F-Value</b>	<b>p-value</b>
<b>Sport</b>	3	0.2	0.076	0.075	.973
<b>Error</b>	385	387.8	1.007		
<b>Total</b>	388	388	1.083		

A Tukey Post-Hoc analysis was conducted to verify the finding of the ANOVA. The Tukey Post-Hoc revealed non-statistical significance between all of the comparisons.

Because of the violation of normality, a Kruskal Wallis Test was also conducted. The test also revealed non-statistical significance ( $\chi^2(3) = 0.69$ ,  $p = .88$ ). Thus, there is no difference in intrinsic motivation scores and type of sport.

**Hypothesis 3.** Hypothesis 3 stated: There is no difference between student extrinsic motivation score and type of sport. To test this hypothesis, an ANOVA was conducted between type of sport and the extrinsic motivation factor score. Before the ANOVA was conducted, the assumption of equal variances was tested by Levene’s Test for Homogeneity of Variances. The test revealed non-statistical significance for extrinsic scores across sport ( $F(3, 385) = 0.946$ ,  $p = .418$ ). Therefore, the null hypothesis that the scores across sport had equal variances was not

rejected and homogeneity of variances was assumed. The assumption of normality was also tested for the extrinsic scores across sport type by the Shapiro Wilks Test. The test revealed statistical significance ( $W=.98$ ,  $p < .001$ ). To further investigate, Shapiro Wilks test for multivariate normality was conducted. The test revealed non-statistical significance for the extrinsic scores across BOTH ( $W = 0.99$ ,  $p = .96$ ), and INDIVIDUAL ( $W = 0.96$ ,  $p = .12$ ), but revealed statistical significance across NONE ( $W = 0.97$ ,  $p < .01$ ) and TEAM ( $W = .98$ ,  $p < .05$ ). Thus, the null hypothesis that the extrinsic scores across sport type came from a normal distribution was rejected and normality was assumed to be violated. Since there was a violation in normality and the group sizes are unequal (Individual ( $n = 45$ ), Team ( $n = 143$ ), Both ( $n = 31$ ), None ( $n = 170$ )), both an ANOVA and Kruskal Wallis Test was conducted (Harwell et. all, 1992, Lix et. all, 1996).

The ANOVA revealed there was a non-statistical difference between mean extrinsic scores and type of sport ( $F(3,385) = 0.038$ ,  $p = .99$ ,  $\text{cohen-}f = 0.017$ , with an achieved post hoc power of .057). Thus, the null hypothesis that there is no difference between student extrinsic motivation score and type of sport was not rejected. An ANOVA table for the ANOVA between extrinsic motivation scores and type of sport is given in Table 9.

**Table 9.**  
*ANOVA Table for Extrinsic Scores and Type of Sport*

	<b>df</b>	<b>Sum Sq</b>	<b>Mean Sq</b>	<b>F-Value</b>	<b>p-value</b>
<b>Sport</b>	3	0.1	0.0384	0.038	.99
<b>Error</b>	385	387.9	1.0075		
<b>Total</b>	388	388	1.0459		

A Tukey Post-Hoc analysis was conducted to verify the finding of the ANOVA. The Tukey Post-Hoc revealed non-statistical significance between all of the comparisons.

Because of the violation of normality and unequal group sample sizes, a Kruskal Wallis Test was also conducted. The test also revealed non-statistical significance ( $\chi^2(3) = 0.16, p = .98$ ). Thus, there is no difference in extrinsic motivation scores and type of sport.

**Hypothesis 4.** Hypothesis 4 stated: There is no difference between student amotivation score and type of sport. To test this hypothesis, an ANOVA was conducted between type of sport and the amotivation factor score. Before the ANOVA was conducted, the assumption of equal variances was tested by Levene's Test for Homogeneity of Variances. The test revealed non-statistical significance for amotivation scores across sport ( $F(3, 385) = 0.64, p = .59$ ). Therefore, the null hypothesis that the scores across sport had equal variances was not rejected and homogeneity of variances was assumed. The assumption of normality was also tested for the amotivation scores across sport type by the Shapiro Wilks Test. The test revealed statistical significance ( $W=.96, p < .001$ ). To further investigate, Shapiro Wilks test for multivariate normality was conducted. The test revealed statistical significance across NONE ( $W = 0.96, p < .001$ ), TEAM ( $W = .96, p < .001$ ), INDIVIDUAL ( $W = .89, p < .001$ ), and BOTH ( $W = 0.92, p < .05$ ). Thus, the null hypothesis that the amotivation scores across sport type came from a normal distribution was rejected and normality was assumed to be violated. Since there was a violation in normality and the group sizes are unequal (Individual ( $n = 45$ ), Team ( $n = 143$ ), Both ( $n = 31$ ), None ( $n = 170$ )), both an ANOVA and Kruskal Wallis Test was conducted (Harwell et. all, 1992, Lix et. all, 1996).

The ANOVA revealed there was a non-statistical difference between mean amotivation scores and type of sport ( $F(3,385) = 0.811, p = .49, \text{cohen-}f = 0.079$ , with an achieved post hoc power of .225). Thus, the null hypothesis that there is no difference between student

amotivation score and type of sport was not rejected. An ANOVA table for the ANOVA between amotivation scores and type of sport is given in Table 10.

**Table 10.**  
*ANOVA Table for Amotivation Scores and Type of Sport*

	df	Sum Sq	Mean Sq	F-Value	p-value
<b>Sport</b>	3	2.4	0.8123	0.811	.488
<b>Error</b>	385	385.6	1.0015		
<b>Total</b>	388	388	1.8138		

A Tukey Post-Hoc analysis as conducted to verify the finding of the ANOVA. The Tukey Post-Hoc revealed non-statistical significance between all of the comparisons.

Because of the violation of normality and unequal group sample sizes, a Kruskal Wallis Test was also conducted. The test also revealed non-statistical significance ( $\chi^2(3) = 4.21, p = .24$ ). Thus, there is no difference in amotivation scores and type of sport.

**Hypothesis 5.** Hypothesis 5 stated: There is no difference between student GPA and type of sport. To test this hypothesis, an ANOVA was conducted between type of sport and student GPAs. Before the ANOVA was conducted, the assumption of equal variances was tested by Levene’s Test for Homogeneity of Variances. The test revealed non-statistical significance for intrinsic scores across sport ( $F(3, 385) = 0.64, p = .59$ ). Therefore, the null hypothesis that the GPAs across sport had equal variances was not rejected and homogeneity of variances was assumed. The assumption of normality was also tested for the student GPAs across sport type by the Shapiro Wilks Test. The test revealed statistical significance ( $W=.94, p < .001$ ). To further investigate, Shapiro Wilks test for multivariate normality was conducted. The test revealed statistical significance across NONE ( $W = 0.93, p < .001$ ), TEAM ( $W = .94, p < .001$ ), INDIVIDUAL ( $W = .88, p < .001$ ), and BOTH ( $W = 0.92, p < .05$ ). Thus, the null hypothesis

that the student GPAs across sport type came from a normal distribution was rejected and normality was assumed to be violated. Since there is a violation in normality and the group sizes are unequal (Individual (n = 45), Team (n = 143), Both (n = 31), None (n = 170)), both an ANOVA and Kruskal Wallis Test was conducted (Harwell et. all, 1992, Lix et. all, 1996).

The ANOVA revealed there was a non-statistical difference between mean student GPA and type of sport ( $F(3,385) = 1.247$ ,  $p = .29$ ,  $\text{cohen-}f = 0.098$ , with an achieved post hoc power of .333). Thus, the null hypothesis that there is no difference between student GPA and type of sport was not rejected. An ANOVA table for the ANOVA between amotivation scores and type of sport is given in Table 11.

**Table 11.**  
*ANOVA Table for Student GPAs and Type of Sport*

	df	Sum Sq	Mean Sq	F-Value	p-value
<b>Sport</b>	3	2.25	0.7495	1.247	.292
<b>Error</b>	385	231.37	0.6010		
<b>Total</b>	388	233.62	1.3505		

A Tukey Post-Hoc analysis was conducted to verify the finding of the ANOVA. The Tukey Post-Hoc revealed non-statistical significance between all of the comparisons.

Because of the violation of normality and unequal group sample sizes, a Kruskal Wallis Test was also conducted. The test also revealed non-statistical significance ( $X^2(3) = 3.32$ ,  $p = .34$ ). Thus, there is no difference in student GPAs and type of sport.

### **Multiple Regression and Hypothesis 1.**

The primary research question if this study is “Is participating in a team sport, individual sport, both, or no sport and a student’s motivation (intrinsic, extrinsic, or amotivation) predictive of a student’s academic success?”. The hypothesis that coincides with the primary

research question is hypothesis 1 and it states: “Participating in a team sport or individual sport and a student’s motivation (intrinsic, extrinsic, amotivation) does not predict a student’s academic success.” Multiple regression techniques were used to answer this research question. The dependent variable was student GPA and the independent variables were intrinsic factor scores, extrinsic factor scores, amotivation factor scores, student grade level, and sport type. Before the multiple regression was conducted, dummy variables were made for grade level and sport type in Excel. The dummy variables for grade level were made to compare seniors to all other grade levels (freshman, sophomore, and junior) and the dummy variables for sport type were made to compare TEAM to all other sport types (INDIVIDUAL, BOTH, and NONE).

An initial linear model was conducted to predict student GPA from intrinsic factor scores, extrinsic factor scores, amotivation factor scores, grade level and sport type. All independent variables were found to be non-statistically significant predictors of GPA except for amotivation. The summary of the beta coefficients, standard errors, t-values, and p-values for the model can be found in Table 12.

**Table 12.**  
*Summary of Initial Linear Model*

	<b>Estimate(beta)</b>	<b>Standard Errors</b>	<b>t-value</b>	<b>p-value</b>
<b>(Intercept)</b>	3.072	0.093	32.864	p < .001
<b>TEAM -&gt; BOTH</b>	0.021	0.149	0.139	p = .890
<b>TEAM -&gt; INDIVIDUAL</b>	0.130	0.129	1.003	p = .317
<b>TEAM -&gt; NONE</b>	-0.062	0.086	-0.719	p = .472
<b>Seniors -&gt; Juniors</b>	0.012	0.110	0.111	p = .911
<b>Seniors -&gt; Sophomores</b>	-0.157	0.113	-1.397	p = .163
<b>Seniors -&gt; Freshman</b>	-0.074	0.104	-0.721	p = .471
<b>Intrinsic</b>	-0.024	0.043	-0.547	p = .585
<b>Extrinsic</b>	0.023	0.041	0.562	p = .575
<b>Amotivation</b>	0.200	0.046	4.817	p < .001

The overall model was found to be statistically significant ( $F(9, 379) = 3.807, p < .001$ ).

The AIC of the model was 893.92 and the adjusted  $R^2$  value was 0.061.

To further investigate if a different model would be better at significantly predicting student GPA from the independent variables, backwards elimination was used to find a reduced model. In the reduced model two predictors were retained: Amotivation and the comparison of seniors to sophomores. However, amotivation was still the only statistically significant predictor. The summary of the beta coefficients, standard errors, t-values, and p-values for the model can be found in Table 13.

**Table 13.**  
*Summary of Backward Elimination Reduced Model*

	<b>Estimate(beta)</b>	<b>Standard Errors</b>	<b>t-value</b>	<b>p-value</b>
<b>(Intercept)</b>	3.04	0.043	70.852	$p < .001$
<b>Seniors -&gt; Sophomores</b>	-0.143	0.096	-1.549	$p = .122$
<b>Amotivation</b>	0.198	0.038	5.182	$p < .001$

The overall model was found to be statistically significant ( $F(2, 386) = 15.29, p < .001$ ).

The AIC for the reduced model was 883.92 and the adjusted  $R^2$  value was 0.069. This indicated the reduced model is a better fit model to predict student GPA than the full model. The reduced model was retained as the best model for the study. Confidence intervals at the .95 level for the beta coefficients in the reduced model are summarized in Table 14.

**Table 14.**  
*Confidence Intervals for Beta Coefficients in Reduced Model*

	<b>95% Confidence Interval</b>
<b>(Intercept)</b>	(2.96, 3.12)
<b>Seniors -&gt; Sophomores</b>	(-0.33, 0.04)
<b>Amotivation</b>	(0.12, 0.27)

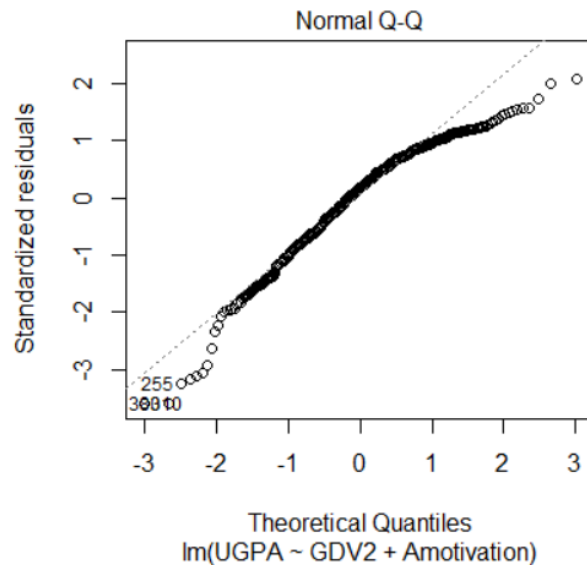
Diagnostics were run on the reduced model. To determine if any cases were exerting high influence on the model, the hat matrix was investigated. Since the model has 2 predictors and a sample size of 389, values in the hat matrix of higher than  $\left(\frac{3(2+1)}{389}\right) = 0.0231$  were examined (Field et. all, 2012). No cases have values higher than 0.0231. Thus, no cases exert a very high influence on our model.

To investigate if there is suspicion of multicollinearity, the Variance Inflation Factor (VIF) was examined for the model. The VIF for Amotivation was 1.005321 and the VIF for the comparison from seniors to sophomores was 1.005321. Since both VIF values are less than 10, the variables are not highly correlated and there is no reason to suspect multicollinearity (Field et. all, 2012).

Cook's Distance for each case in the reduced model was investigated and no values were reported above 1. Thus, no values cause concern (Field et. all, 2012).

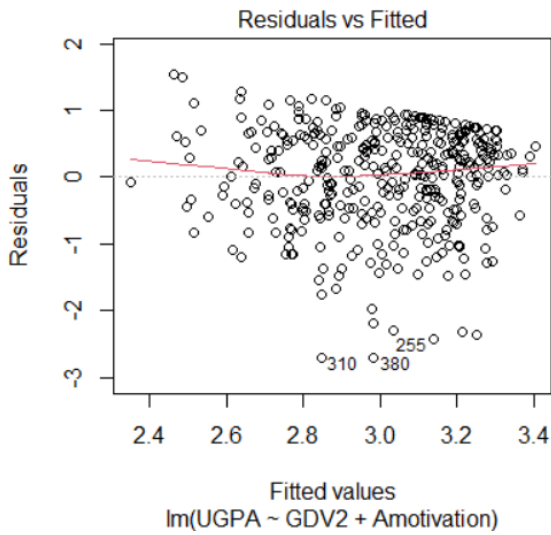
To assess the assumption of normality, the normal q-q plot was examined for the reduced model. The reduced model's normal q-q plot is given in Figure 17. There was some deviation in the lower left and upper right of the line indicating that normality could be a concern (Field et. all, 2012). However, research has shown that with large sample sizes and few outliers, the regression model is robust to the assumption of normality in violated (Knief and Forstmeier, 2020; Normality, 2021).



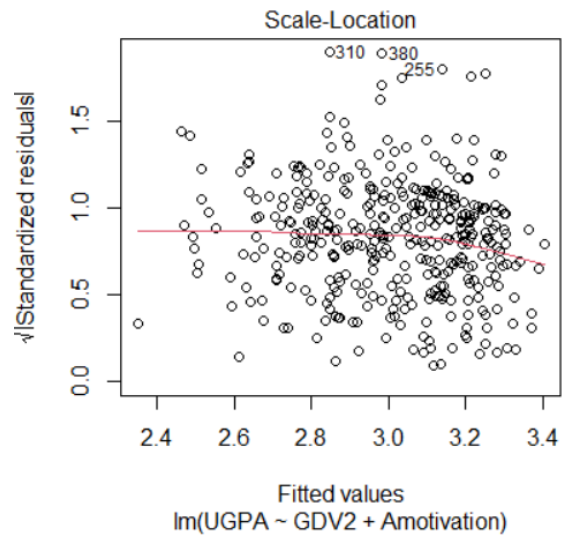


**Figure 17.**

To assess the assumption of homogeneity of variances and linearity, the Residuals vs. Fitted plot and Scale Location plot were examined. The Residuals vs. Fitted plot is given in Figure 18 and the Scale Location plot is given in Figure 19. In the Residuals vs. Fitted plot, since there does not seem to be a pattern or bouncing effect, linearity was assumed. Further, in the Residuals vs. Fitted plot, the red line is almost horizontal and the deviation of the points around the line appear to be equal indicating there was not a concern of violating homogeneity of variances. Likewise, in the Scale-Location plot, the red line is almost horizontal and the deviation from the red line appears to be equal. This further indicated there was not a concern of violating homogeneity of variances (Field et. all, 2012).



**Figure 18.**



**Figure 19.**

When trying to determine if participating in a team sport, individual sport, both, or no sport and a student's motivation (intrinsic, extrinsic, or amotivation) predictive of a student's academic success, the reduced model was retained. It was found that amotivation is the only statistically significant predictor of student GPA. The beta coefficient in the reduced model for amotivation was 0.198 (95% CI = (0.12, 0.27)). The amotivation factor score was calculated using the PCA on the AMS survey. The items that loaded onto the amotivation component were items #5, #12, #19 and #26. Before the PCA, the responses to these items had to be flipped due to the fact that all other items indicated a strong positive reason to attend school. For this reason, the higher the amotivation factor a scores mean a student has less amotivation or more motivation. Thus, when interpreting the amotivation beta coefficient, it can be interpreted that the higher the amotivation score, meaning the more motivation a student

exhibits, the higher the student GPA. It is found that between type of sport, grade level, and type of motivation, amotivation is the only significant predictor of academic success.

### **DATA INVOLVING TEACHER ASSESSED MOTIVATION SCORES**

The first 5 hypotheses of the study incorporated motivation scores based on student surveys. These motivation scores were interpreted as the level of motivation that is self-perceived by the student. It is of interest to the study, to include data that rates a student's motivation based on the perception of the teacher. The teacher perceived motivation scores were found using the ACES – Academic Enabler scale. Based on the PCA on the ACES - Academic Enabler scale by DiPerna and Elliot, items 1-3, 6-7, 9, and 15 - 18 of the ACES Academic Enabler Scale are associated with student academic motivation (Smith, 2015). In the current study, the math teachers at Lutheran West filled out the ACES Academic Enabler Scale survey on each student. Due to the nature of a math class, Item 2: "Offers to read aloud" was answered as "NA" by the majority of the math teachers. For this reason, item 2 was omitted from the final teacher motivation score. Responses to items 1,3, 6-7, 9, and 15 – 18 were summed in Excel to create a teacher's perceived motivation scores for each student. The teacher motivation scores could range from 9 to 45, with 9 being the lowest motivation score possible to 45 being the highest motivation score possible.

Teacher motivation scores were then paired with student data including sport type, student GPA, intrinsic motivation factor scores, extrinsic motivation, and amotivation factor scores in Excel. Not all teacher surveys were a direct match with the student data. Thus, when teacher motivation scores were matched with student data, data that did not have a match was

deleted and a sample size of 322 was retained. Descriptives for teacher motivation scores across sport are given in Table 15.

**Table 15.**  
*Mean and Standard Deviations of Teacher Motivation Score by Sport Type*

<b>Sport Type</b>	<b>Mean</b>	<b>SD</b>
Team (n = 117)	34.24	7.93
Individual (n = 38)	37.57	6.97
Both (n = 24)	34.63	6.33
None (n = 143)	31.56	9.46

**Hypothesis 6.** Hypothesis 6 stated: There is no difference between a teacher's perceived motivation score and type of sport. To test this hypothesis, an ANOVA was conducted between type of sport and the teacher motivation score. Before the ANOVA was conducted, the assumption of equal variances was tested by Levene's Test for Homogeneity of Variances. The test revealed statistical significance for teacher motivation scores across sport ( $F(3, 318) = 4.151, p < .01$ ). Therefore, the null hypothesis that the scores across sport had equal variances was rejected and the assumption homogeneity of variances was assumed to be violated. The assumption of normality was also tested for the teacher motivation scores across sport type by the Shapiro Wilks Test. The test revealed statistical significance ( $W=.94, p < .001$ ). To further investigate, Shapiro Wilks test for multivariate normality was conducted. The test revealed non-statistical significance for the teacher motivation scores across BOTH ( $W = 0.98, p = .86$ ), but the test revealed statistical significance across INDIVIDUAL ( $W = 0.89, p < .01$ ), NONE ( $W = 0.97, p < .01$ ) and TEAM ( $W = .98, p < .05$ ). Thus, the null hypothesis that the teacher motivation scores across sport type came from a normal distribution was rejected and normality was assumed to be violated. Since there a violation in normality, homogeneity of

variances, and the group sizes are unequal (Individual (n = 38), Team (n = 117), Both (n = 24), None (n = 143)), both an ANOVA and Kruskal Wallis Test was conducted (Harwell et. all, 1992, Lix et. all, 1996).

The ANOVA revealed there was a statistical significant difference between mean teacher motivation scores and type of sport ( $F(3,318) = 5.9, p < .001, \text{cohen-}f = 0.234$ , with an achieved post hoc power of .953). Thus, the null hypothesis that there is no difference teacher perceived motivation scores and type of sport was rejected. An ANOVA table for the ANOVA between teacher motivation scores and type of sport is given in Table 16.

**Table 16.**  
*ANOVA Table for Teacher Motivation Scores and Type of Sport*

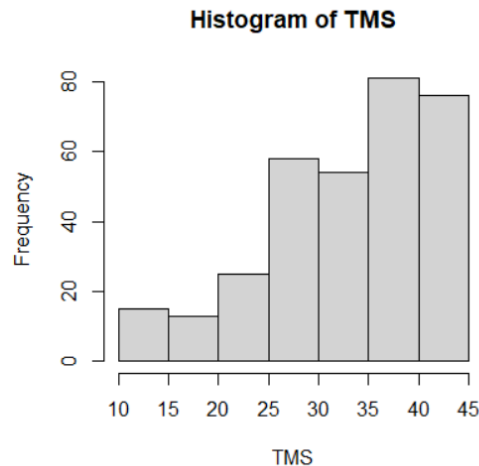
	<b>df</b>	<b>Sum Sq</b>	<b>Mean Sq</b>	<b>F-Value</b>	<b>p-value</b>
<b>Sport</b>	3	1265	421.6	5.9	p < .001
<b>Error</b>	318	22725	71.5		
<b>Total</b>	321	23990	493.1		

A Tukey Post-Hoc analysis was conducted to verify the finding of the ANOVA. The Tukey Post-Hoc revealed statistical significance between sport type NONE and INDIVIDUAL ( $p < .001, 95\%CI = (-10.004, -2.034)$ ). The post-hoc analysis revealed the teacher motivation scores of students who played no sport were 6.02 points lower than students who played an individual sport. The Tukey Post-Hoc also revealed the comparison between sport type TEAM and NONE was close to statistical significance ( $p = .055, 95\%CI = (-0.042, 5.402)$ ) at the .05 level and revealed that teacher motivation scores of students who played a team sport were 2.68 points higher than those who played no sport.

Because of the violation of normality, homogeneity of variances, and unequal group sample sizes, a Kruskal Wallis Test was also conducted. The test also revealed statistical

significance ( $\chi^2(3) = 15.026, p < .01$ ). Thus, there is a difference in teacher motivation scores and type of sport.

**Hypothesis 7.** Hypothesis 7 stated: There is no relationship between teacher perceived motivation score and student intrinsic, extrinsic or amotivation scores. To test this hypothesis, three correlation tests were conducted between type of motivation (intrinsic, extrinsic, and amotivation) and the teacher motivation score. A histogram of the Teacher Motivation Scores, given in Figure 20, revealed that normality appears to be violated. Thus, the Spearman method will be used to verify the correlation (Field et. all, 2012).



**Figure 20.**

The first correlation test was conducted between teacher motivation scores and intrinsic motivation factor scores. The test revealed statistical significance ( $t(320) = 4.067, p < .001, 95\% \text{ CI} = (0.115, 0.323)$ ). The sample correlation estimate was 0.228. The correlation between teacher motivation scores and intrinsic motivation factor scores using the Spearman method was 0.2212. The correlation test revealed that higher teacher perceived motivation scores corresponds to higher intrinsic motivation scores.

The second correlation test was conducted between teacher motivation scores and extrinsic motivation factor scores. The test revealed statistical significance ( $t(320) = 2.797$ ,  $p < .01$ , 95% CI = (0.046, 0.259). The sample correlation estimate was 0.154. The correlation between teacher motivation scores and extrinsic motivation factor scores using the Spearman method was 0.142. The correlation test revealed that higher teacher perceived motivation scores corresponds to higher extrinsic motivation scores.

The third correlation test was conducted between teacher motivation scores and amotivation factor scores. The test revealed statistical significance ( $t(320) = 6.1551$ ,  $p < .001$ , 95% CI = (0.224, 0.420)). The sample correlation estimate was 0.325. The correlation between teacher motivation scores and amotivation factor scores using the Spearman method was 0.365. The correlation tests revealed that higher the teacher motivation scores correspond to higher amotivation scores. Because of the way the PCA was conducted, a higher amotivation score means the student has less amotivation. Thus, the correlation test revealed that higher teacher motivation score corresponds to lesser amounts of amotivation exhibited.

**Hypothesis 8.** Hypothesis 8 stated: There is no relationship between teacher perceived motivation score and student GPA. To test this hypothesis, a correlation test was conducted between student GPA and the teacher motivation score. A histogram of the Teacher Motivation Scores, given in Figure 20, revealed that normality appears to be violated. Thus, the Spearman method will be used to verify the correlation (Field et. all, 2012).

The correlation test was conducted between teacher motivation scores and student GPA. The test revealed statistical significance ( $t(320) = 13.394$ ,  $p < .001$ , 95% CI = (0.524, 0.665)). The sample correlation estimate was 0.599. The correlation between teacher

motivation scores using the Spearman method was 0.630. The correlation test revealed that higher teacher motivation scores corresponds to higher student GPAs.

**Hypothesis 9.** Hypothesis 9 stated: Student's motivation, as perceived by the teacher, and type of sport is not predictive of a student's academic success. To test this hypothesis, a multiple linear regression was conducted between student GPA as the dependent variable and the teacher motivation score and type of sport as the independent variables. Dummy variables were created for sport type and were made to compare TEAM to all other sport types (INDIVIDUAL, BOTH, and NONE).

A multiple linear regression model (Model 1) was conducted to predict student GPA from teacher motivation score and sport type. Teacher motivation score was found to be the only statistically significant predictor of student GPA. The summary of the beta coefficients, standard errors, t-values, and p-values for model 1 can be found in Table 17.

**Table 17.**  
*Summary of Multiple Linear Regression Model 1*

	<b>Estimate(beta)</b>	<b>Standard Errors</b>	<b>t-value</b>	<b>p-value</b>
<b>(Intercept)</b>	1.104	0.152	7.281	p < .001
<b>Teacher Motivation Score</b>	0.054	0.0040	13.28	p < .001
<b>TEAM -&gt; BOTH</b>	-0.050	0.139	-0.360	p = .719
<b>TEAM -&gt; INDIVIDUAL</b>	0.0978	0.116	0.842	p = .401
<b>TEAM -&gt; NONE</b>	0.131	0.078	1.683	p = .093

The overall model was found to be statistically significant ( $F(4, 317) = 45.92, p < .001$ ) with the adjusted  $R^2$  value of 0.359. Confidence intervals at the .95 level for the beta coefficients in Model 1 are summarized in Table 18.



**Table 18.**

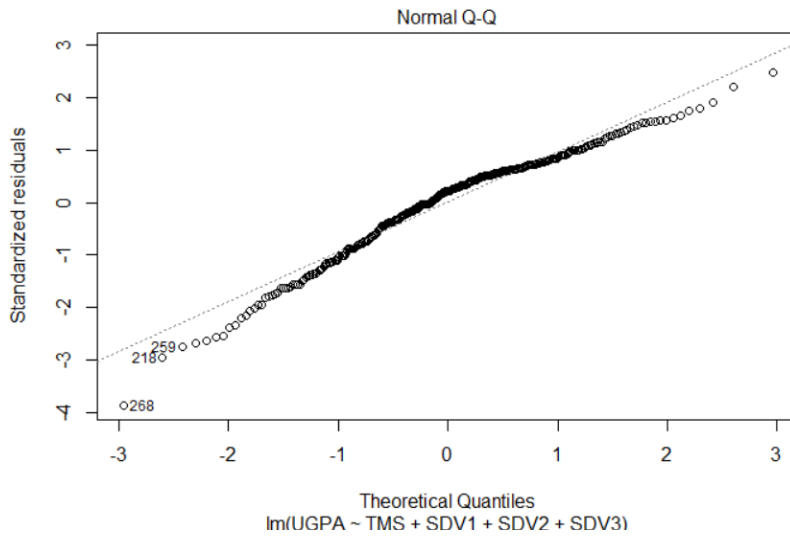
*Confidence Intervals for Beta Coefficients in Multiple Linear Regression Model 1*

	<b>95% Confidence Interval</b>
<b>(Intercept)</b>	(0.805, 1.402)
<b>Teacher Motivation Scores</b>	(0.046, 0.061)
<b>TEAM -&gt; BOTH</b>	(-0.322, 0.223)
<b>TEAM -&gt; INDIVIDUAL</b>	(-0.131, 0.326)
<b>TEAM -&gt; NONE</b>	(-0.022, 0.284)

Diagnostics were run on the simple linear regression model. To determine if any case was exerting high influence on the model, the hat matrix was investigated. Since the model has 4 predictor and a sample size of 322, values in the hat matrix of higher than  $\left(\frac{3(4+1)}{322}\right) = 0.0466$  were examined (Field et. all, 2012). It was found that cases 171 and 214 had values higher than 0.0466. Thus, these cases exerted a high influence on our model. Since all cases were only slightly higher than 0.0466 (the largest value was case 171 with a value of 0.0498), the choice was made not to eliminate the cases.

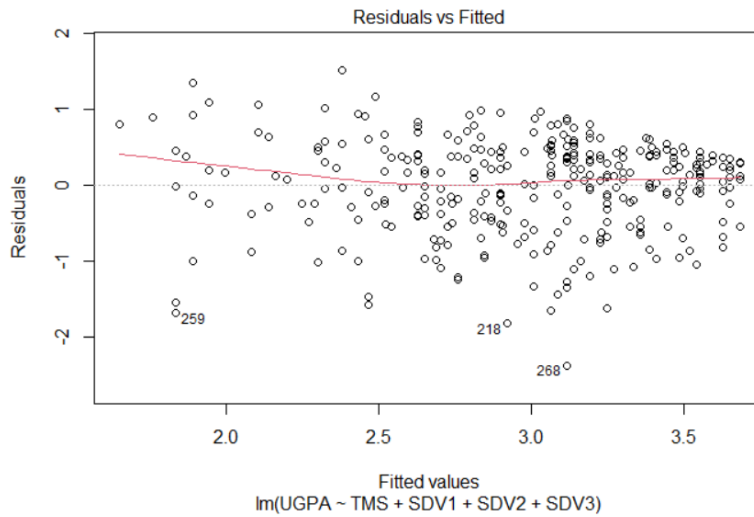
Cook's Distance for each case in the reduced model was investigated and no values were reported above 1. Thus, no values cause concern (Field et. all, 2012).

To assess the assumption of normality, the normal q-q plot was examined for Model 1. The Model 1 normal q-q plot is given in Figure 21. There is some deviation in the lower left, upper right, and middle of the line indicating that normality could be a concern (Field et. all, 2012). However, research has shown that with large sample sizes and few outliers, the regression model is robust when it comes to the violation of the assumption of normality (Knief and Forstmeier, 2020; Normality, 2021).

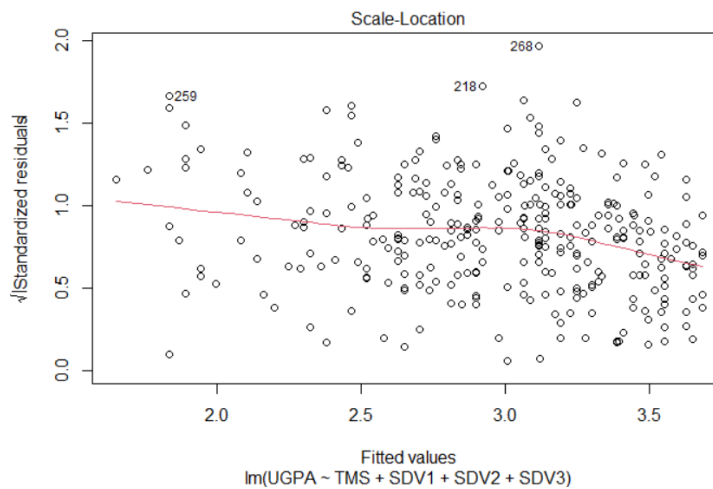


**Figure 21.**

To assess the assumption of homogeneity of variances and linearity, the Residuals vs. Fitted plot and Scale Location plot were examined. The Residuals vs. Fitted plot for Model 1 is given in Figure 22 and the Scale Location plot for model 1 is given in Figure 23. In the Residuals vs. Fitted plot, there does not seem to be a pattern or bouncing effect, thus linearity was assumed. Further, in the Residuals vs. Fitted plot, the red line is almost horizontal and the deviation of the points around the line appear to be equal. This indicated there was not a concern of violating homogeneity of variances. Likewise, in the Scale-Location plot, the red line is almost horizontal and the deviation from the red line appears to be equal. This further indicated there is not a concern of violating homogeneity of variances (Field et. all, 2012).



**Figure 22.**



**Figure 23.**

When testing if teacher motivation score and sport type is predictive of a student’s GPA, a multiple linear regression technique was conducted. It was found that teacher motivation score is the only statistically significant predictor of student GPA. The beta coefficient in the reduced model for amotivation was 0.054 (95% CI = (0.046, 0.061)). When interpreting the teacher motivation score beta coefficient, it can be interpreted that as the teacher motivation

score moves up one unit, the student GPA moves up 0.054. The test revealed that teacher perceived motivation score of a student is a predictor of student GPA and a higher teacher perceived motivation score predicts a higher student GPA.

### **Conclusion**

Chapter 4 discussed the tests and findings of the current study. The chapter answers the nine research questions through statistical techniques such as ANOVA techniques, correlation tests, and multiple regression. Chapter 5 will discuss the conclusions and implications of the study.

## CHAPTER V: CONCLUSION

### Introduction

This chapter will summarize the findings of the study conducted at Lutheran West High School to analyze the relationship between a student's motivation, sport participation, and academic success. This chapter will summarize findings from Chapter 4 to further answer the research questions of the study. The findings will then be related to previous studies related to this topic and recommendations will be given for future studies.

### Summary of the Study and Findings

As high school sports have grown in the past 50 years with more and more students participating in a high school sport (*NFHS*, 2021), it is important for schools and researchers to examine the effect of athletics on academics. The current study was conducted to investigate if type of student motivation and type of sport was predictive of academic success. The study was conducted at Lutheran West High School using surveys and data from students and teachers at the school to analyze the research questions. The study collected data on each student participant's GPA, type of sport (individual, team, both, or none), and grade level. The AMS survey was given to each student to collect the level of each type of motivation (intrinsic, extrinsic, or amotivation) a student possesses. Factor scores for each type of motivation were created using factor analysis techniques on the AMS responses. The ACES – Academic Enabler scale was given to the math teachers of Lutheran West to collect a teacher perceived motivation score from each student participant. The data was analyzed and the research questions were tested using the statistical techniques as stated in Chapter 3.

Research question #6 was used to find the relationship between teacher motivation scores and student motivation scores. The study measured student motivation in two ways: (1) an overall motivation scores as perceived by the teacher and (2) student self-assessed motivation scores categorized into intrinsic motivation, extrinsic motivation, and amotivation. To interpret the findings of the study, it is important to understand the relationship between the teacher motivation scores and the student motivation scores. Multiple correlation tests were used to test if there is a relationship between teacher perceived motivation scores and student intrinsic motivation, extrinsic motivation, and amotivation scores. The first correlation test was conducted between teacher perceived motivation scores and student intrinsic motivation scores. The test resulted in a statistically significant weak but positive relationship between teacher perceived motivation scores and student intrinsic motivation scores. The second correlation test was conducted between teacher perceived motivation scores and student extrinsic motivation scores. The test resulted in statistically significant weak but positive relationship between teacher perceived motivation scores and student extrinsic motivation scores. The third correlation test was conducted between teacher perceived motivation scores and student amotivation scores. The test resulted in a statistically significant weak but positive relationship between teacher perceived motivation scores and student amotivation scores. Because of how the amotivation factor score was created, the student amotivation score is interpreted reversely. This means that the higher the amotivation score should be interpreted as the more motivation a student possesses. Thus, it was found that higher teacher perceived motivation scores correspond to lesser amounts of amotivation

exhibited. In general, it is concluded that that higher teacher motivation scores are correlated with higher levels student motivation.

Research questions #1, #2, #3, and #5 investigated the relationship between motivation and type of sport. These questions were answered using ANOVA techniques. The first ANOVA (research question #1) was used to test if there was a difference between type of sport and intrinsic motivation scores. The ANOVA resulted in no significant difference between student intrinsic motivation scores and type of sport. It is interpreted that playing a certain type of sport (team, individual, both, or none) does not determine if students see themselves as having higher or lower levels of intrinsic motivation. The second ANOVA (research question #2) was used to test if there is a difference between type of sport and extrinsic motivation scores. The ANOVA resulted in no significant difference between student extrinsic motivation scores and type of sport. It is interpreted that playing a certain type of sport (team, individual, both, or none) does not determine if students see themselves as having higher or lower levels of extrinsic motivation. The third ANOVA (research question #3) was used to test if there is a difference between type of sport and amotivation scores. The ANOVA resulted in no significant difference between student amotivation scores and type of sport. It can be interpreted that playing a certain type of sport (team, individual, both, or none) does not determine if students see themselves as having higher or lower levels of amotivation. The fourth ANOVA (research question #5) was used to test if there is a difference between type of sport and teacher perceived motivation scores. The ANOVA resulted in a significant difference between teacher perceived motivation scores and type of sport. The Tukey Post Hoc test found that students who play no sport have lower motivation scores than students who play only individual and

only team. It can be interpreted that participating in either a team sport or individual sport has a relationship with higher levels of student motivation as perceived by the teacher. Since there is a weak but positive correlation with teacher motivation scores and student motivation scores, the study also suggests an indirect relationship with type of sport and student motivation. In general, the findings of research questions #1, #2, #3, and #5 suggest that, although weak, there is a relationship with sports influencing higher levels of motivation in students.

Research questions #7 investigated the relationship between teacher motivation scores and academics. A correlation test was used to test if there is a relationship between teacher perceived motivation scores and student GPA. The correlation test resulted in a statistically significant positive relationship between teacher perceived motivation scores and student GPA. It was found by interpreting the positive correlation coefficient that higher teacher perceived motivation scores correspond to higher student GPAs.

The purpose of the study was to find if motivation and type of sport work together to predict academic success. This purpose was investigated through the statistical techniques used to answer the primary research question and research question #8. Since motivation was found in two ways: teacher scores and student scores, the researcher found it important to run tests using each type. The primary research question was answered by using student motivation scores along with type of sport as independent variables in a multiple regression technique to predict academic success. The regression model revealed only a statistically significant relationship between amotivation and GPA. The regression model found that a lack of motivation is predictive of a lower GPA. The model found non-statistically significant



relationship on intrinsic motivation, extrinsic motivation, or type of sport with student GPA. Research questions #8 used teacher perceived motivation scores along with type of sport as independent variables in a multiple regression technique to predict academic success. The regression model revealed only a statistically significant relationship between teacher motivation score and GPA. The regression model found that a higher teacher motivation score is predictive of a higher GPA. The model found non-statistically significant relationship with type of sport and student GPA. Both models revealed the only statistically significant predictor of academics is general motivation (not necessarily more intrinsic or extrinsic). There was no direct relationship between type of sport and student GPA. To further verify this, the researcher implemented research question #4.

Research questions #4 investigated the relationship between academics and type of sport. ANOVA techniques were implemented to see if there was a relationship between type of sport and student GPA. The ANOVA resulted in non-significant difference between student GPAs and type of sport. It is interpreted that playing a certain type of sport (team, individual, both, or none) does not have a direct relationship with student GPA.

Overall, the study found a strong direct relationship between motivation and academic success. The more motivation a student possesses (not necessarily intrinsic or extrinsic) has a relationship with a higher GPA. The study found no direct relationship between type of sport and student academic success, but the study argues for an indirect relationship between the two. The study found that higher levels of motivation is predictive of higher student GPAs. The study also found a weak but positive relationship between student motivation and sport participation. The study argues that, although a weak relationship, participating a sport plays a

role in increased motivation levels and increased motivation levels result in a higher GPA. Thus, sports have an indirect relationship with academic success and could play a role in increasing student GPA.

### **Integration with the Literature**

The literature on sports, motivation, and academic success is segregated into three separate categories: academics vs. sports, academics vs. motivation, and motivation vs. sports. The purpose of this study was to find the connection between all three: sports, motivation, and academic success. Algharaibeh (2020) found that students who are more motivated are more likely to seek help and students who are more likely to seek help do better academically. Algharaibeh (2020) found that higher motivation levels results in more academic success. Vansteenkiste, Simons, Lens, Sheldon, and Deci (2004) and Gottfreid, Clayton, Gottfreid, and Morris (2005) suggest that higher levels of intrinsic motivation have a positive relationship with academic success. Lepper, Corpus, and Iyengar (2005) further suggest that extrinsic and intrinsic motivation should not be viewed as polar opposites, but rather educators should do their best to increase intrinsic motivation. The literature on motivation and academics is strongly finds that the more motivation a student possesses (specifically intrinsic), the more academic success is found. The current study is consistent with research in that that study finds a strong positive relationship between general motivation and academic success. The study, however, did not find relationship with the specific types of motivation (intrinsic or extrinsic). The current research favors intrinsic motivation with academic success, yet the current study cannot verify or deny this relationship. The only finding the current study suggest in terms of

motivation and academics is that more motivation a student possesses (not necessarily intrinsic or extrinsic) results in higher student GPAs.

Kucukibis and Gul (2019), Jakobsen (2014), and Toktas and Bas (2019) all found in their separate studies that there was not much difference between motivation (intrinsic or extrinsic) and sport category (team or individual). Kucukibis and Gul (2019) found that there was no statistically significant difference between team and individual sport for extrinsic motivation and intrinsic motivation. They did find that there was a statistically significant difference between team and individual sport for amotivation scores (Kucukibis and Gul, 2019). Toktas and Bas (2019) found that even though there was not much difference in extrinsic and intrinsic motivation scores between team and individual sport, students participating in team and individual sports did exhibit levels of both intrinsic and extrinsic motivation. Šmela, Pačesová, Kraček, & Hájovský (2017) found that participating in athletics has a positive relationship with motivation to perform. The current research suggests that motivation (not necessarily intrinsic or extrinsic) has a positive relationship with sport participation. The current study's findings are consistent with the research in an indirect way. The current study does not find direct differences in sport participation and in intrinsic, extrinsic, and amotivation scores as assessed by the student, but does find that sport participation (team or individual) does have a relationship with higher overall motivation scores as assessed by the teacher. Since higher levels of teacher motivation are correlated with higher levels of intrinsic or extrinsic motivation scores, a weak but indirect relationship with higher levels of motivation (either intrinsic or extrinsic) and sport participation is suggested. This is consistent with the current research that

finds that students who participate in athletics tend to have higher levels of motivation in general (Šmela et. all, 2017).

Current research has a strong argument that suggests that playing a sport has a relationship with academic success (Lipscomb, 2007; Fejgin, 1994; McNeal, 1995; Marsh, 1993). Examining the current research brings insight to the meaning of “academic success” and sport participation. Marsh (1993) found a statistically significant relationship with sport participation and academic success as measured by items such as academic self-concept, school attendance, time spent on homework, and taking honors courses, but he found no statistically significant effect on standardized test scores and school grades. In another study, Fejgin (1994) found that high school sport participation does have a positive effect on academic success as measured by school grades, discipline problems, etc. The current study used ANOVA techniques and multiple regression techniques to test if sport participation has an effect on academic success as measured by student GPA. In all the tests, there was found to be no statistically significant relationship between type of sport (individual, both, team, or none) and academic success. The current study suggests that there is no direct effect of sport participation on academic success which is inconsistent with the current research. However, the current study suggests an indirect positive relationship between sports and academics through motivation. This indirect relationship brings to the surface a more interesting topic in the research of sports and academics. The more interesting research questions surrounding sports and academics is not the “Is there is a relationship?”, but “Why is there a relationship?”. Broh (2002) found that the Social Capital Model plays a large role in why there is a relationship between sports and academics. The Social Capital Model suggests that a person benefits through membership in

social networks (one of these networks potentially being sports). Broh (2002) finds that participating in a sport results in stronger connections between parents, students, and teachers which leads to more support for the student. More support then leads to more academic success. This study suggests that a student does well academically not because of direct sport participation, but because of the atmosphere sport participation brings. This idea plays largely into the theoretical framework of the study: The Self-Determination Theory.

### **Connection to the Theoretical Framework**

The Self-Determination Theory, created by Edward Deci and Richard Ryan, examines the relationship between intrinsic motivation, extrinsic motivation, and amotivation. They theorize that competence, autonomy, and relatedness are the three needs needed for healthy human growth, social development, well-being, and developing motivation. Ryan and Deci (2000) suggest that the more these three needs are met, higher levels of self-determination are accomplished. They find that the more a person is self-determined, higher levels of intrinsic motivation are possessed. Ryan and Deci (2000) state the highest level of motivation one can possess is intrinsic motivation and propose that environments that emphasize the three needs of autonomy, relatedness, and competence promote intrinsic motivation. Social groups that one feels connected too that promote autonomy and competence enhances engagement, internalization, and positive motivation (Ryan and Deci, 2000).

The current study finds that possessing motivation results in more academic success. Ryan and Deci (2000) theorize that environments that emphasize autonomy, relatedness, and competence enhance motivation. Broh (2002) also finds that when one feels connected to social networks, academic success grows. By interpreting the research, it is clear that students

need environments that promote growth in their motivation. The finding of the current study is consistent with this need to find ways to motivate students. Sports could be suggested as being one of these ways. Being a part of a sport team surrounds students with a possible environment that could support competence, relatedness, and autonomy. It is important for schools to have students participating in activities where they feel supported, competence, and motivated. Creating social contexts that allow for autonomy, competence, and relatedness, “is of great significance for individuals who wish to motivate others in a way that produces commitment, effort, and high-quality performance” (Ryan and Deci, 2000). Sports could be one of the answers but is not the only answer. This study suggests and is consistent with the research that schools need to continue to find ways to motivate students in the classroom and sport participation could be one of the ways to make this happen.

### **Summaries and Implications**

There have been many studies conducted to find the relationship between sport participation and academic success, the relationship between sport participation and motivation, and the relationship between motivation and academic success (see Lipscomb, 2007; Fejgin, 1994; McNeal, 1995; Marsh, 1993; Vansteenkiste et. all, 2004; Gottfreid, 2001; Algharaibeh, 2020; Arslan et. all, 2015; Sari et. all, 2015, Šmela et. all, 2017). Some studies have found that participation in a sport is positive for student academics (Fejgin, 1994; McNeal, 1995; Marsh, 1993), some studies found that motivation plays a positive role in academic success (Gottfreid et. all, 2005; Algharaibeh, 2020), and other studies found that participation in a sport corresponds to higher performance motivation (Šmela et. all, 2017). The current study

tries to find the connection between the current research on the relationship between motivation, sport participation, and academic success. The findings of the study have shown to be consistent at times and inconsistent at times with the current research. The major conclusions of the study are summarized to be:

1. There is a relationship between type of sport and student motivation scores when measured by the teacher. It was found that playing a team or individual sport resulted in higher motivation scores than playing no sport. There is not a direct relationship between type of sport and student assessed motivation scores. However, there is a positive correlation between teacher perceived motivation scores and student assessed motivation scores. The study could argue there is an indirect relationship between student possessing intrinsic or extrinsic motivation and participating in a sport. It is concluded that students' participation in athletics have a relationship with exhibiting positive levels of motivation.

2. There is a relationship between student GPA and student motivation scores when measured by the teacher. It was found that the higher the teacher perceived motivation scores, the higher the student GPA. There is also a relationship between student assessed motivation scores and student GPA. It was found when the student possesses less motivation, the higher the student GPA. It can be concluded that students possessing positive levels of motivation (not specific to intrinsic or extrinsic) have higher GPAs.

3. The study then used type of sport and student motivation to investigate if together they would be predictors of student GPA through multiple regression techniques. When the models

were run, it was found that motivation was the only statistically significant predictor of academic success.

4. There is not a direct relationship between type of sport and student GPA. In all tests run in the study, it was found there is no direct relationship between type of sport and student GPA. However, the study found that possessing more motivation is predictive of a higher GPA and playing a sport has a relationship with higher levels of motivation. The conclusions of the study could be argued that there is an indirect positive relationship between academic success and participation in a sport.

The study's conclusions are that possessing motivation (not specifically intrinsic or extrinsic) is a predictor of academic success and participating in a sport plays a role in increases student motivation, yet participation in a sport does not have a direct relationship with academic success as measured by student GPA. The study was conducted in a small, private school in the suburbs. The findings of the study could be used in two ways for these schools. First, it is important to note that motivation plays a role in student academic success. Schools can use this knowledge to encourage activities that increases student motivation. Second, sport participation may be a useful tool in stimulating a student's motivation which could lead to higher levels of academic success. However, sport participation is not the "cure" for poor academic performance. Sport participation should not be pushed on students for higher levels of academic performance, but could be used as a way to encourage students to get involved and lead to some positive outcomes.



## Recommendations

The current study was a start to find if student motivation and sport participation play a role in academic success. There are four ways that future research on this topic could be conducted to further and even better the study:

1. Sample Size: the current study's sample size was taken from a small, private high school in the suburbs. It would be of interest for future studies to be conducted at large, public high schools.
2. Measurement of Academic Success: the current study used student GPA as the measure for academic success. Academic success can be measured in many different ways such as academic self-concept, school attendance, time spent on homework, taking honors courses, standardized tests, and grades (Fejgin, 1994; Marsh, 1993). Future studies should consider measuring academic success in other ways to further investigate the effect of motivation and sport participation on academic success.
3. Extra-Curricular Participation: The current study used sport participation along with motivation to find that sport participation increases motivation which increases academic success. Sport participation may not be the only way to increase student motivation. Future studies should look at other extra-curricular activities to see if student involvement as a whole is a true indicator of academic success.
4. Measure of Motivation: The current study used surveys to find student motivation scores as perceived by the teacher and as assessed by the student themselves. The study found

that using teacher perceived motivation scores yielded slightly different results than when using student assessed motivation scores. It would be of interest to further investigate the relationship between how a student sees themselves versus how a teacher sees the student when it comes to academic motivation.

## **Conclusions**

As high school athletics continue to grow with data showing more and more high school students participating in sports since 1971 (*NFHS, 2021*), the studies that test if sport participation has an influence on academic performance become more important. Studies have shown that sport participation plays a role in positively influencing academic success (*Lipscomb, 2007; Fejgin, 1994; McNeal, 1995; Marsh, 1993*). The current study adds to the research by showing that sport participation is not the “end all, be all” for academic success, but helps enhance student motivation. The current study found that motivation plays a direct role in student academic success. It is more important to conclude that schools should find ways to further motivate students in and out of the classroom to increase overall student motivation. This study finds that sports is one of the ways that may increase student motivation, but may not be the only way. Sport participation should not be pushed on students by the school, but rather to be used as a tool to help increase student motivation when needed. This study further shows that student motivation is key to academic success, and it is the school’s job to find ways to increase student motivation to better the school.

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## Appendix A

Appendix A includes the form the teachers signed before participating in the study.

### Consent Form for Participation in a Research Study Shawnee State University

1. **Study Title:** Effects of Sports and Student Motivation on Academic Success
2. **Performance Site:** Lutheran West High School, Rocky River, OH 44116
3. **Investigators:** The following investigators are available for questions about this study:  
  
Brittany Erdmann, [berdmann@lutheranwest.com](mailto:berdmann@lutheranwest.com).  
Days and times available: M-F 8:00am – 3:30 pm.  
  
Douglas Darbro, [ddarbro@shawnee.edu](mailto:ddarbro@shawnee.edu)  
Days and times available: M-F 9:00am – 5:00pm
4. **Purpose of the Study:** The purpose of this study is to research the relationship between playing a sport, motivation, and academic success at the high school level.
5. **Subject Inclusion:** Subjects of this study are students enrolled at Lutheran West High School, Grades 9-12. You, the teacher, are not a subject in this study, but an informant on student motivation in the classroom.
6. **Number of subjects:** 550
7. **Study Procedures:** In this study, I'll ask you, the informant, to make ratings about each of your student's motivation in the classroom by means of a survey. These rating are your perception of the student's motivation in the classroom. These ratings will then be used by the researcher to investigate how these ratings relate to the student's academic performance and the type of sport in which they participate. You, the teacher, will not give any information on student academic performance or sport participation.
8. **Benefits:** There are no direct benefits to the participant or informant, but the findings may benefit the associations' view on involvement in sports.
9. **Risks:** The only risk is the inadvertent release of sensitive information collected during the study. However, student motivation ratings will only be reported in a general sense and your, the teacher's, identity will absolutely not be reported.
10. **Right to Refuse:** You may choose not to participate or to withdraw from the study at any time without penalty or loss of any benefit to which they might otherwise be entitled.
11. **Privacy:** Results of the study may be published, but no names or identifying information will be included in the publication. Participant and informant identity will remain confidential unless disclosure is required by law. All



documents will be scanned and stored in Lutheran West's secured server for a period of 3 years, at which point the documents will be destroyed. Any paper copies will be destroyed immediately.

12. **Signatures:** I verify that I am 18 years of age or older. The study has been discussed with me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators listed above. If I have questions about subjects' rights or other concerns, I can contact Dr. Sunil Ahuja, Acting Provost, Institutional Review Board, (740) 351-3641. I agree to participate in the study described above and acknowledge the investigator's obligation to provide me with a signed copy of this consent form.

Signature of Teacher \_\_\_\_\_ Date \_\_\_\_\_

## Appendix B

Appendix B is the consent form for students to participate in the study.

### Consent Form for Participation in a Research Study Shawnee State University

1. **Study Title:** Effects of Sports and Student Motivation on Academic Success
2. **Performance Site:** Lutheran West High School, Rocky River, OH 44116
3. **Investigators:** The following investigators are available for questions about this study:  
  
Brittany Erdmann, (952) 594 - 9730, [berdmann@lutheranwest.com](mailto:berdmann@lutheranwest.com).  
Days and times available: M-F 8:00am – 3:30 pm.  
  
Douglas Darbro, [ddarbro@shawnee.edu](mailto:ddarbro@shawnee.edu)  
Days and times available: M-F 9:00am – 5:00pm
4. **Purpose of the Study:** The purpose of this study is to research the relationship between playing a team sport, individual sport, or no sport, type of motivation, and academic success at the high school level.
5. **Subject Inclusion:** Students Enrolled at Lutheran West High School, Grades 9-12
6. **Number of subjects:** 550
7. **Study Procedures:** Your child will be asked to fill out a survey that asks questions about his or her motives for attending school. The student's school records including GPA, Ohio State test scores, teacher surveys, and type of sport they play will be used in the study.
8. **Benefits:** There are no direct benefits to the participant, but the findings may benefit the associations view on involvement in sports.
9. **Risks:** The only study risk is the inadvertent release of sensitive information collected during the study. However, this study is anonymous and your student's identification will not be known to the researcher and will absolutely not be reported.
10. **Right to Refuse:** Subjects may choose not to participate or to withdraw from the study at any time without penalty or loss of any benefit to which they might otherwise be entitled.
11. **Privacy:** Results of the study may be published, but no names or identifying information will be included in the publication. Participant identity will remain confidential unless disclosure is required by law. All documents will be stored in (describe secure or locked location) for a period of 3 years, at which point the documents will be destroyed.

12. **Signatures:** I verify that I am the guardian of \_\_\_\_\_ (child's name(s)). The contents of the study have been made known to me and all my questions have been answered. I may direct additional questions regarding study specifics to the investigators listed above. If I have questions about subjects' rights or other concerns, I can Dr. Sunil Ahuja, Acting Provost, Institutional Review Board, (740) 351-3641. I have discussed this with my child \_\_\_\_\_ and I agree to allow \_\_\_\_\_ (child's name(s)) to participate in the study described above and acknowledge the investigator's obligation to provide me with a signed copy of this consent form.

Signature of Parent/Guardian \_\_\_\_\_ Date \_\_\_\_\_

## Appendix C

Appendix B includes the Academic Motivation Scale (AMS) Survey that was used to survey the students on the types of motivation they exhibit: intrinsic motivation, extrinsic motivation, and amotivation.

### Scale Description

This scale assesses High School motivation and contains 7 sub-scales assessing Intrinsic motivation towards knowledge, accomplishments and stimulation, as well as external, introjected and identified regulation, and amotivation. It contains 28 items assessed on a 5-point scale.

### References

Vallerand, R.J., Blais, M.R., Brière, N.M., & Pelletier, L.G. (1989). Construction et validation de l'Échelle de Motivation en Éducation (EME). Revue canadienne des sciences du comportement, 21, 323-349.

## ACADEMIC MOTIVATION SCALE (AMS-HS 28)

### HIGH SCHOOL VERSION

Adapted from AMS - College version

*Robert J. Vallerand, Luc G. Pelletier, Marc R. Blais, Nathalie M. Brière,  
Caroline B. Senécal, Évelyne F. Vallières, 1992-1993*

*Educational and Psychological Measurement, vols. 52 and 53*

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### WHY DO YOU GO TO SCHOOL ?

*Using the scale below, indicate to what extent each of the following items presently corresponds to one of the reasons why you go to school.*

Does not correspond at all	Corresponds a little	Corresponds moderately	Corresponds a lot	Corresponds exactly		
1	2	3	4	5	6	7

*WHY DO YOU GO TO SCHOOL ?*

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1. Because I need at least a high-school degree in order to find a high-paying job later on.	1	2	3	4	5	6	7
2. Because I experience pleasure and satisfaction while learning new things.	1	2	3	4	5	6	7
3. Because I think that a high-school education will help me better prepare for the career I have chosen.	1	2	3	4	5	6	7
4. Because I really like going to school.	1	2	3	4	5	6	7
5. Honestly, I don't know; I really feel that I am wasting my time in school.	1	2	3	4	5	6	7
6. For the pleasure I experience while surpassing myself in my studies.	1	2	3	4	5	6	7
7. To prove to myself that I am capable of completing my high-school degree.	1	2	3	4	5	6	7
8. In order to obtain a more prestigious job later on.	1	2	3	4	5	6	7
9. For the pleasure I experience when I discover new things never seen before.	1	2	3	4	5	6	7
10. Because eventually it will enable me to enter the job market in a field that I like.	1	2	3	4	5	6	7
11. Because for me, school is fun.	1	2	3	4	5	6	7
12. I once had good reasons for going to school; however, now I wonder whether I should continue.	1	2	3	4	5	6	7
13. For the pleasure that I experience while I am surpassing myself in one of my personal accomplishments.	1	2	3	4	5	6	7
14. Because of the fact that when I succeed in school I feel important.	1	2	3	4	5	6	7
15. Because I want to have "the good life" later on.	1	2	3	4	5	6	7
16. For the pleasure that I experience in broadening my knowledge about subjects which appeal to me.	1	2	3	4	5	6	7
17. Because this will help me make a better choice regarding my career orientation.	1	2	3	4	5	6	7
18. For the pleasure that I experience when I am taken by discussions with interesting teachers.	1	2	3	4	5	6	7
19. I can't see why I go to school and frankly, I couldn't care less.	1	2	3	4	5	6	7
20. For the satisfaction I feel when I am in the process of accomplishing difficult academic activities.	1	2	3	4	5	6	7

21. To show myself that I am an intelligent person.	1	2	3	4	5	6	7
22. In order to have a better salary later on.	1	2	3	4	5	6	7
23. Because my studies allow me to continue to learn about many things that interest me.	1	2	3	4	5	6	7
24. Because I believe that my high school education will improve my competence as a worker.	1	2	3	4	5	6	7
25. For the "high" feeling that I experience while reading about various interesting subjects.	1	2	3	4	5	6	7
26. I don't know; I can't understand what I am doing in school.	1	2	3	4	5	6	7
27. Because high school allows me to experience a personal satisfaction in my quest for excellence in my studies.	1	2	3	4	5	6	7
28. Because I want to show myself that I can succeed in my studies.	1	2	3	4	5	6	7

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## Appendix D

Appendix C includes the ACES – Academic Enabler Scale used to survey students on their perception of a student’s motivation. The scale included is the not full scale, but the 27 questions obtained for the study.

Academic Competence Motivation Scale (Teacher)                      Student ID # \_\_\_\_\_

Match the student ID number with the name of the student on the list provided and write the ID number in the blank at the top. Rate the statements below on a 5-point Frequency scale for how often the behavior is observed for the given student. Scale is given below.

<b>Never</b>						<b>Almost Always</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>		
1. Offers answers	1	2	3	4	5	NA
2. Offers to read out loud	1	2	3	4	5	NA
3. Communicates when asked	1	2	3	4	5	NA
4. Classroom Engagement	1	2	3	4	5	NA
5. Favors tasks that challenge	1	2	3	4	5	NA
6. Is driven to learn	1	2	3	4	5	NA
7. Perseveres with challenging tasks	1	2	3	4	5	NA
8. Remains on task	1	2	3	4	5	NA
9. Is focused on the goal	1	2	3	4	5	NA
10. When asked, will correct wrong behavior	1	2	3	4	5	NA
11. Will take suggestions from teachers	1	2	3	4	5	NA
12. Will listen to what others say	1	2	3	4	5	NA
13. Cooperates with adults properly	1	2	3	4	5	NA
14. Cooperates with peers properly	1	2	3	4	5	NA
15. Capitalizes on learning experiences	1	2	3	4	5	NA
16. Is responsible for own learning	1	2	3	4	5	NA
17. Sticks with a task	1	2	3	4	5	NA
18. Turns in excellent work	1	2	3	4	5	NA
19. Contributes in class	1	2	3	4	5	NA
20. Speaks when asked	1	2	3	4	5	NA
21. Will answer questions	1	2	3	4	5	NA
22. Accepts leadership in group situations	1	2	3	4	5	NA
23. Takes notes	1	2	3	4	5	NA
24. Attentive in class	1	2	3	4	5	NA

25. Will alter problematic behavior if asked	1	2	3	4	5	NA
26. Articulates frustration properly	1	2	3	4	5	NA
27. Does assignments according to directions	1	2	3	4	5	NA



## **BIBLIOGRAPHY<sup>1</sup>**

Brittany Erdmann

Candidate for the Degree of

Master of Science Mathematics

**Thesis:** EFFECTS OF SPORTS AND STUDENT MOTIVATION ON ACADEMIC SUCCESS

**Major Field:** Mathematics


**Biographical:** Brittany Erdmann is originally from Chanhassen, MN and moved to Cleveland, Ohio in 2016 to work at Lutheran West High School. Brittany attended Concordia University in Seward, NE from 2011-2015 where she studied secondary education and competed on the track team. Brittany currently teaches math and coaches track at Lutheran West High School.

**Personal Data:** Brittany is one of four children and got her love of math and learning from her parents. She enjoys playing volleyball, basketball, euchre with friends, water skiing, exploring local breweries, and spending time with those she loves.

**Education:** Bachelors of Science Degree in Secondary Education with Endorsements in Mathematics and Theology

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Completed the requirements for the Master of Science in Mathematics, Portsmouth, Ohio in 2021.

A handwritten signature in black ink, appearing to read "Dr. Douglas G. Darbro". The signature is written in a cursive style with a horizontal line extending from the end of the name.

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ADVISER'S APPROVAL: Dr. Douglas Darbro