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Influence of Academic and Cocurricular Engagement, Demographics, and Sport Played on College Student-Athletes' Academic Success

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Walden University
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Alexandra Brown

MS, Syracuse University, 2014

BA, University of Guelph, 2013

Dissertation Submitted in Partial Fulfillment

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Abstract

Eligibility requirements, the pressure to remain eligible at all costs, and demanding time schedules are high stakes issues that affect the National Colligate Athletic Association (NCAA) student-athletes. A gap in research existed on whether college student-athletes' demographics and engagement predicts their academic success. The purpose of this quantitative research was to determine the extent to which engagement and demographic factors predict student-athletes' academic success, as measured by a self-reported grade of B or higher in NCAA first-year student-athletes. This study was influenced by Astin's student involvement theory and Kuh's concept of engagement. The research question guiding this study addressed the extent to which academic and cocurricular engagement, race, sport played, and gender predict NCAA student-athletes' academic success. Quantitative data were collected from the 2018 National Survey of Student Engagement. The sample analyzed included 1,985 student-athletes. Logistic regression analysis was used to find that males, wrestlers, football players, and Black or African American student-athletes were less likely to achieve academic success, whereas females, tennis players, and both White and Asian student-athletes were more likely to achieve academic success than their peers. Findings were significant at the .05 level, but the variance explained by the models was less than 10%, which implies limited practical significance. Time spent on cocurricular activities and time spent preparing for class did not predict academic success. The findings of this study may be used by the NCAA and higher education institutions to help understand student-athletes' behaviors and the implications for supporting academic success.

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Dedication

This dissertation is dedicated to my mom. She always selflessly put her children first, she continuously bet on me, and she knew my capabilities long before I did. I am the woman I am today because of the strong women before me. I am forever inspired and indebted to be all that I can for my children. I love you, mama.

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My husband, JT, who took a leap of faith with me when I told him I wanted to go back to school. We've since moved over 10 times, across the country, at times on a day's notice. But that's life with my superstar professional athlete/professional video game streamer/activist husband. You've taught me what it means to be a teammate and what perseverance through impossible looks like. Moving forward, please address me as Dr. Brown though.

Finally, I owe a lot of thanks to Dr. Cheryl Keen and Dr. John Flohr. Their mentorship, wisdom, and dedication to helping me complete this dissertation should not go unnoticed. I have been inspired by Dr. Keen since we first met, and she told me to not only read old research by dead white men. Iconic.

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Chapter 1: Introduction to the Study

Introduction

Eligibility requirements, the pressure to remain eligible at all costs, and demanding time schedules affect college student-athletes' academic success. Due to the controversial nature of these pressures, the National Colligate Athletic Association (NCAA) student-athlete eligibility rules have been the focus of discussions for years among athletic departments and the sports industry. Maintaining eligibility for high performing athletes is carries critical implications, because winning teams can bring in more revenue, alumni donations, and help recruit other desired players. New (2016) detailed several years of infractions and academic fraud to raise athletes' grade point averages (GPAs) at several universities. In a recent case the NCAA began investigating an 18-year long period where the University of North Carolina, an NCAA Division 1 university, offered fake "paper classes" to thousands of students. Half of the students who took the classes were college student-athletes who needed to maintain their eligibility (Trahan, 2017). The NCAA punished Division I institutions at least 15 times from 2006 through 2016 for academic fraud (New, 2016).

In addition, the NCAA has recently been under scrutiny for changing rules that limit student-athletes' days off from athletic activities. A new rule has reduced the NCAA's regulations regarding student-athletes' time off. The NCAA used to guarantee all Division I student-athletes at least one day off per week during their regular season. However, as of June 2018, the new rule enables schools to eliminate the one day off per week rule. A school can schedule three regular-season games in a week and provides athletes with 2 days off in their previous or subsequent week. Therefore, this can create, in a 28-day work cycle, a pattern that NCAA student-athletes can be forced to dedicate 24 days straight to athletics and be off from athletics only on Days 1 and 2, and 27 and 28 (Edelman, 2018).

Researchers have already investigated the positive influences that athletic participation has on academic performance. These positive influences include academic success such as graduation rates, grades, and test scores and behavioral areas such as leadership and relationships (Aljarallah & Bakoban, 2015; Bowen & Greene, 2012; Bradley, Keane, & Crawford, 2012; Castelli et al., 2014; Insler & Karam, 2017; Schultz, 2016; Yeung, 2015). Researchers have found little inconclusive relationship among NCAA student-athletes and independent variables such as: race, division, gender, in-season versus out of season athletic participation, and academic major (Beron & Piquero, 2016; Bimper, 2014; Robst & Keil, 2000; Schultz, 2016). However, in a rare conflicting older study, Maloney and McCormick (1993) studied college student-athletes in revenue sports and found that they performed academically worse than the other athletes. Revenue sports included football and basketball. Also, Routon and Walker (2015) found that males and football and basketball players earned lower GPAs.

In light of the increasing pressures college student-athletes are under, it was surprising that I found no recent studies that replicate, affirm, or challenge findings. The NCAA has undergone different changes in its policies throughout the years. Some of the changes involve academic eligibility and rules surround student participation for the institutions. Those changes may affect their student-athletes' academic success. For example, the NCAA's requirements for time-off from athletics for students. I was unable to find recent studies that demonstrate how demographic variables or engagement variables are related to academic success.

In this chapter, I introduce the study, explain the problem that I investigated, and outline my purpose in the study. I also present background information on the NCAA and the academic eligibility requirements. I then discuss the purpose of this nonexperimental, quantitative study. I discuss the theoretical framework guiding this research and nature of the study and present the assumptions, limitation, and delimitations for this study. I conclude with the significance of this research study.

Background

In this background section, I introduce the NCAA and provide a brief background on the association's governance, its core purpose, and reform history. I also discuss eligibility requirements and academic success statistics of NCAA student-athletes and describe the NCAA student-athletes' demographic make-up nationally. Finally, I discuss student engagement, a concept linked closely with athletic participation. This background on the NCAA may be important in understanding the larger context of the student-athlete experience and may be helpful in explaining the results. I discuss the gap in knowledge, which I will address, and I will conclude with why this study is needed.

The NCAA

The NCAA formed in 1906, is a nonprofit organization that regulates athletes from 1,123 institutions and organizes the athletic programs of universities in Canada and the United States. Regulated by the NCAA are more than 480,000 student-athletes competing annually in college sports and there are 19,500 teams and 24 sports. The NCAA claims its core purpose is “to govern competition in a fair, safe, equitable and sportsmanlike manner, and to integrate intercollegiate athletics into higher education so that the educational experience of the student-athlete is paramount” (The Official Site of the NCAA, n.d.). The NCAA’s mission is to prioritize the well-being, fairness, and academics so that college athletes can achieve success in the classroom, on the field, and for life (The Official Site of the NCAA, n.d.).

NCAA reform. The NCAA has undergone several changes throughout the years to uphold the academic integrity of their student-athletes and institutions. For example, the concern for organization and control over quality in athletics began in the early 1900s. Smith (2000) claimed that the first significant academic reform change in the NCAA occurred in 1947. The Sanity Code was passed as a response to issues of academic integrity and student recruitment. The NCAA appointed a committee to uphold the rules. However, the only sanction was expulsion and because expulsion was so severe it left the committee unable to enforce the code. The code and its six principles of conduct were overturned in 1951 (Smith, 2000). The second academic reform occurred in 1965 when the 1.600 rule was established. Incoming students had to have a predicted freshman GPA of 1.6 and they needed to keep that GPA throughout their college career to remain eligible. In 1973, the 1.600 rule was replaced by the 2.0 rule. The 2.0 rule required students to earn a 2.0 GPA in high school to play (Singleton, 2013).

According to Singleton (2013), the most significant change occurred in 1986 with Proposition 48. It should be noted that given this date, someone might think something more significant has happened in the last 11 years. Proposition 48 outlines student requirements.

1. Students must have taken the prescribed core curriculum in high school.
2. Must have achieved a 2.0 GPA in high school.
3. Must have earned a combined Mathematical and Verbal and score of 700 on the Scholastic Aptitude Test (SAT) (Singleton, 2013).

NCAA eligibility and academic success. To remain eligible to compete at the Division I level, students must remain on track to graduate from college, having 40% of the required coursework for a degree completed by the end of the second year, 60% by the end of the third year, and 80 % by the end of their fourth year. Students must also earn a minimum of six credits each term and achieve the minimum GPA requirements related to the school's GPA standards for student graduation. In Division II, "student-athletes also must earn a 1.8 cumulative GPA after earning 24 hours, a 1.9 cumulative GPA after earning 48 hours, and a 2.0 cumulative GPA after earning 72 hours" (The Official Site of the NCAA, n.d.). In Division III, student-athletes must make satisfactory progress toward their degree and be in good academic standing and as determined by the institution (The Official Site of the NCAA, n.d.).

The NCAA recently claimed that eight in 10 Divisions I student-athletes are earning their bachelor's degree. The NCAA also claimed that the current graduation rate for Division I is 68%, Division II is 56%, and Division III is 67% (The Official Site of the NCAA, n.d.). The graduation rate is higher than the national average of all college students in Division I and III students, and not far behind in Division II students.

According to the National Center for Education Statistics, “the 6-year graduation rate for first-time, full-time undergraduate students who began seeking a bachelor’s degree at a 4-year degree-granting institution in fall 2009 was 59%” (The NCES Fast Facts Tool provides quick answers to many education questions (National Center for Education Statistics), n.d.).

Data were collected by the NCAA in 2006 on NCAA Division I student-athletes and how they spent their time. During the active season of their sport, the average Division I student-athletes spent 37.3 hours per week on academics and 35.4 hours per week on athletics. *Academic hours* were defined as time spent on all classroom activities including labs, discussion groups, time spent studying, and academic work done outside of the classroom. *Athletic hours* were defined as time spent on physical activity (such as practicing, training, and competing) and nonphysical activities (such as meetings and film study). In total, student-athletes spent 29% of their time sleeping, 25% of their time on academic activities, 24% on athletic activities, 14% socializing, relaxing, and spending time with family, 5% on other extracurriculars, and 2% on jobs. The NCAA also reported that on average, female student-athletes spend less time on their sport than men (The Official Site of the NCAA, n.d.).

Academic success. For the purpose of this research, *academic success* was defined as a grade of C or above. The NCAA suggests a GPA of 2.0 to remain eligible. The NCAA considers more factors than just GPA in their academic eligibility. However, across all divisions, a 2.0 is a common standard that represents good academic standing

(The Official Site of the NCAA, n.d.). A 2.0 GPA converts to an approximate letter grade of C (How to Calculate Your GPA, n.d.).

NCAA student-athlete demographics. The NCAA publishes a database on NCAA demographics annually on their website which dates back to 2008. The most recent information posted was for the 2018 year. See Table 1 for 2018 NCAA student-athlete demographic data regarding race and gender of NCAA athletes nationally (The Official Site of the NCAA, n.d.).

Table 1

NCAA Student-Athletes' Demographics in 2018

Demographic	Independent variable	Data frequency %
Gender		
	Male	56
	Female	44
Race		
	White	65
	Black	16
	Hispanic/Latino	6
	Two or more races	4
	Nonresident alien	4
	Other	3
	Asian	2
	American Indian	0.4

National Survey of Student Engagement

The National Survey of Student Engagement (NSSE) was designed to assess the extent that students are engaged in positive educational practices and what they gain from their college experience (Umbach, Palmer, Kuh, & Hannah, 2006). The NSSE does not measure learning outcomes directly, rather it surveys for students' self-reported grades and measures of other behaviors that can be correlated with learning and development in college. The NSSE database aims to measure student engagement. Students learn more when they are highly engaged in different educational and purposeful activities (Umbach et al., 2006). Other scholars have also found this to be the case (Astin, 1984; Kuh, Douglas, Lund, & Ramin-Gyurnek, 1994; Kuh, Schuh, Whitt, & Associates, 1991; Pascarella & Terenzini, 1991; Tinto, 1987). Researchers have tested the validity of the NSSE database and found that it is a dependable measure of engagement, that it is capable of measuring different areas of student growth, and it can be used for assessing engagement (Miller, Sarraf, Dumford, & Rocconi, 2016; Pascarella, Seifert, & Blaich, 2010; Pike, 2012).

Student engagement. Researchers have also studied engagement on campus, focusing on college level student-athletes versus nonathletes. Rettig and Hu (2016) studied a sample of first-year college students using the NSSE database. The researchers compared engagement, educational outcomes, and the relationship between engagement and educational outcomes for student-athletes versus nonathletes in low and high-profile sports. They found that athletes and nonathletes had similar levels of academic engagement but that low profile and nonathletes experienced higher academic achievement than high profile student-athletes (Rettig & Hu, 2016). Therefore, sometimes when college student-athletes are grouped together as a whole and analyzed the results may be different than if college student-athletes were analyzed in smaller groups and based on their different characteristics.

Umbach et al. (2006) also used data from the NSSE database to research how educational experiences of college student-athletes and if there was a relationship between the level of competition (NCAA division, NAIA membership) and engagement. The researchers found, like Rettig and Hu (2016), that athletes and nonathletes were equally engaged with their academics. Female athletes were slightly more likely to interact and to engage academically. They also found that the nature and frequency of student-athlete engagement did not differ among institutions, that male student-athletes earned lower grades than nonstudent athletes, and the effect of being a student-athlete on grades differed significantly by institution (Umbach et al., 2006).

Gap in Knowledge

There was a gap in current research regarding NCAA student -athletes' academic success. Although researchers have investigated the positive influence that athletic participation have on academic performance (Aljarallah & Bakoban, 2015; Bowen & Greene, 2012; Bradley et al., 2012; Castelli et al., 2014; Insler & Karam, 2017; Schultz, 2016; Yeung, 2015), much of the research that focused on NCAA student-athletes and variables such as gender and grades were inconclusive or showed little relationship between GPA and gender (Beron & Piquero, 2016; Bimper, 2014; Robst & Keil, 2000; Schultz, 2016). Researchers have also used NSSE data to analyze engagement and academic success among student-athletes (Rettig & Hu, 2016; Umbach et al., 2006), but those studies did not focus on NCAA students. I asked for NCAA student-athletes' academic and personal information but was denied by several schools. Due to this gap in knowledge and lack of current research and access to data sources that would allow examination of a wider set of variables, I believed this research using an available dataset with wide participation was justified and needed.

Problem Statement

For this study, I analyzed the problem of student-athletes' time commitments. I analyzed how school and athletic engagement, race, type of sport played, and gender may influence academic success. The independent variables used for this study were the students' gender (man, woman, another gender identity, or prefer not to respond), race (American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or Other Pacific Islander, White, Other, or prefer not to respond), time spent on cocurricular activities (including organizations, campus publications, student government, fraternity or sorority, intercollegiate or intramural sports), and time spent preparing for class (including studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities), and the type of sport played. The dependent variable was self-reported grades (A, A-, B+, B, B-, C+, C, C- or lower). A grade of C or above was considered academic success, whereas a grade of C- or lower was not considered academic success. A letter grade of C or greater aligns with the NCAA's academic requirements to remain eligible. Researchers have already investigated the positive influences that athletic participation have on academic performance in areas such as graduation rates, grades, and test scores and behavioral areas such as leadership and relationships (Aljarallah & Bakoban, 2015; Bowen & Greene, 2012; Bradley, Keane, & Crawford, 2012; Castelli et al., 2014; Insler & Karam, 2017; Schultz, 2016; Yeung, 2015). Researchers have also focused on NCAA student-athletes and race, division, gender, in-season versus out of season athletic participation, and major (Beron & Piquero, 2016; Bimper, 2014; Robst & Keil, 2000; Schultz, 2016). However, much of that research was inconclusive or showed little relationship between the listed variables, with the researchers stating a need for more research and more data to test their hypotheses.

In light of the increasing pressures college student-athletes are under, it was surprising that no recent studies were identified that replicate, affirm, or challenge findings from these research studies. Also, the NCAA is frequently changing its policies and those changes may affect their student-athletes' academic success. For example, the NCAA has recently changed their requirements for time off from athletics for students. The other issue within the NCAA is understanding academic eligibility. I was unable to find recent studies that demonstrate how demographic variables or engagement variables are related to academic success. Most of the data focuses on comparing nonathlete students with student-athletes.

Purpose of the Study

My purpose in this quantitative research was to determine the extent to which academic and cocurricular engagement as represented by time spent on cocurricular activities and time spent preparing for class, race, type of sport played, and gender predict NCAA student-athletes' academic success. There was a gap in research on college student-athletes and the relationship between their demographic factors (race, type of sport, gender), academic success, and engagement. Researchers had already studied student-athletes' demographic factors and their GPA (Beron & Piquero, 2016; Bimper, 2014; Maloney & McCormick, 1993; Rettig & Hu, 2016; Robst & Keil, 2000; Routon & Walker, 2015; Schultz, 2016; Umbach et al., 2006) but this research combined the two areas.

The data provided insight into whether or not there are differences regarding NCAA student-athletes' academic success, race, type of sport played, gender, and how student-athletes allocate their time amongst time spent preparing for class and participating in cocurricular engagements. The independent variables used for this study were the students' gender, type of sport played, race, time spent on cocurricular activities, time spent preparing for class. The dependent variable for this study was self-reported grades. I used archival quantitative NSSE data on student-athlete engagement for this study.

Research Questions

The main RQ focused on understanding what factors have a relationship with NCAA student-athletes' academic success. The main RQ, the subsequent research questions (sub RQ), and null hypothesis for this study included:

- Main Research Question: To what extent do academic and cocurricular engagement as represented by time spent on cocurricular activities and time spent preparing for class, race, type of sport played, and gender predict NCAA student-athletes' academic success?

- Sub Research Question 1: To what extent does time spent preparing for class predict academic success in NCAA student-athletes?

- $H_0$1. The amount of time student-athletes spend preparing for class does not predict academic success in NCAA student-athletes.
- H_a1. The amount of time student-athletes spend preparing for class does predict academic success in NCAA student-athletes.

- Sub Research Question 2: To what extent does time spent participating in cocurriculars predict academic success in NCAA student-athletes?
    - $H_0$2. The amount of time student-athletes spend participating in cocurriculars does not predict academic success in NCAA student-athletes.
    - H_a2. The amount of time student-athletes spend participating in cocurriculars does predict academic success in NCAA student-athletes.
- Sub Research Question 3: To what extent does student-athletes' gender predict academic success in NCAA student-athletes?
    - $H_0$3. The student-athletes' gender does not predict academic success des in NCAA student-athletes.
    - H_a3. The student-athletes' gender does predict academic success in NCAA student-athletes.
- Sub Research Question 4: To what extent does student-athletes' race predict academic success in NCAA student-athletes?
    - $H_0$4. The student-athletes' race does not predict academic success in NCAA student-athletes.

- H_a4. The student-athletes' race does predict academic success in NCAA student-athletes.

- Sub Research Question 5: To what extent does student-athletes' type of sport played predict academic success in NCAA student-athletes?
    - H_05. The student-athletes' type of sport played does not predict academic success in NCAA student-athletes.
    - H_a5. The student-athletes' type of sport played does predict academic success in NCAA student-athletes.

Theoretical Framework of the Study

The theoretical framework for this study was influenced by Astin's (1984) student involvement theory and Kuh's (2009a, 2009b) concept of engagement. In Astin's (1984) student involvement theory, active student participation is viewed as an important aspect of the learning process in higher education. Astin (1984) argued that involvement required a continuous investment of qualitative and quantitative psychosocial and physical energy. The educational benefits are related to the extent to which students are involved, and academic performance is correlated with the student involvement (Astin, 1984).

According to Kuh (2009a) the term *engagement* usually represents "constructs such as quality of effort and involvement in productive learning activities" (Kuh, 2009a, pg. 6). Kuh (2009b) argued that student engagement represents the effort and time that students dedicate to activities that are aligned with their desired college outcomes and what institutions do to encourage students to participate in the activities. The concept represents the relationship between desired college outcomes and the amount of effort and time students devote to their studies and other purposeful activities (Kuh, 2009b).

York, Gibson, and Rankin (2015) used Astin’s (1984) student involvement theory and argued that college academic success could be understood by analyzing three factors. The first is inputs and inputs include demographic characteristics and the student’s existing social and academic experiences. The second factor is the environment, and the environment includes the programs, policies, and experiences encountered in college. The last factor is the outcomes and outcomes include the students’ characteristics, skills, attitude, values, knowledge, behaviors, and beliefs they have as they leave college (York et al., 2015). This research analyzed how inputs such as demographic characteristic, how the environment such as time spent on academics, athletics and other commitments, and how outcomes such as grades are related.

Nature of the Study

This quantitative research was consistent with the main RQ and sub RQs. I analyzed factors that had a relationship with college student-athletes’ academic success as measured by self-reported grades. In order to explore the sub RQs, I gathered data on NCAA student-athletes from the NSSE database. In 2018, 461 schools participated in the NSSE. I requested data from NSSE on NCAA first-year college student-athletes’ gender, race, type of sport played, self-reported grades, how college student-athletes allocate their time to different areas, and how much time is spent preparing for class and participating in cocurriculars. This data enabled an analysis of college student-athlete engagement and if the type of engagement might be positively related to their academic success or negatively related to success. Data was gathered from the NSSE database. I used SPSS to analyze the data.

Definition of Terms

Eligibility is a term frequently used by the NCAA to describe the governing over a student-athlete's academic status and ability to compete. The NCAA has set academic requirements that students must adhere in order to remain academically eligible to compete in their sport. Students must adhere to these requirements as high school students wishing to play NCAA and as college students competing as NCAA student-athletes (The Official Site of the NCAA, n.d.).

Assumptions of the Study

For the purpose of the research, I assumed the following:

1. The respondents have provided honest and forthright responses to the NSSE survey.
2. The NSSE survey is a valid and reliable and measure of what it is trying to measure. I review existing research on the validity of the NSSE survey in Chapter 2 to an extent, one which I discuss.

These assumptions are necessary in the context of this study because the assumptions enable the reader to interpret the research as valid and reliable.

Scope and Delimitations of the Study

I included NCAA schools' student-athletes who participated in the 2018 NSSE survey in this study. The sample included undergraduate first-year student-athletes from different schools, race, type of sport played, and gender from the 2018 academic year.

The NSSE ensured anonymity by selecting a sample, based on the criteria I outline from the total students who completed the survey in 2018 and removing any identifying information. NSSE provided data on students who self-identified as student-athletes who indicated they participated in school funded athletics. This sample enabled me to conduct research that aligns with the main RQ and sub RQs.

The scope of this research problem was limited to the applicable survey questions I selected from the NSSE (see Appendix). I chose those survey questions because they provided data on engagement in athletics, engagement in academics, gender, type of sport played, and race. The questions I selected also limited the population to a selected target group of NCAA student-athletes. The boundaries of this research were defined by the population included and the population excluded. The total population and full NSSE survey could not be used for this research. To answer the main RQ, I selected seven applicable NSSE questions, four multiple choice and two Likert scale questions. I used a purposefully selected sample from the total population of whom complete the survey. I used data from the selected population to answer the main RQ.

The boundaries of this study were also defined by the theoretical framework guiding this research. I used Astin's (1984) student involvement theory and Kuh's (2009a, 2009b) concept of engagement. These theories supported the need to research how engagement factors as measured by time spent preparing for school and time spent on cocurriculars, interact with academic success. By adding race and gender, I also built on existing research whereas incorporating the ideas of Astin's (1984) student involvement theory and Kuh's (2009a, 2009b) concept of engagement.

Limitations of the Study

The first limitation of this study pertained to the scholarly discussions regarding the validity of the NSSE. I used the NSSE's data to conduct the research study and therefore I relied on the validity and reliability of data from an existing database. Researcher have conducted studies and found that the NSSE was both valid and reliable, and not valid or reliable. Miller, Sarraf, Dumford, and Rocconi (2016) and Pike (2012) all researched and tested the validity of the NSSE survey and NSSE database. Pike (2012) found that the NSSE benchmarks provided dependable measures of engagement and that means were also significantly related to institutional outcomes such as graduation rates and retention (Pike, 2012). Pascarella et al. (2010) supported NSSE results on educational practices and student engagement as good measures for growth in areas such as moral reasoning, critical thinking, personal wellbeing, a positive orientation toward literacy activities, and intercultural effectiveness. Miller et al. (2016) found quantitative evidence that supported claims that the engagement indicators were measuring what they intended to measure and that the NSSE had strong construct validity evidence and therefore could be used for assessments.

However, despite this recent research in support of the NSSE's validity and reliability, there was also research that questioned the validity of the NSSE. Porter (2011) questioned the validity of typical college student surveys and the NSSE. Schneider (2009) argued that the NSSE had been used in situations that it is not suited for and creating false education wisdom based on flawed surveys (Schneider, 2009). Campbell and Cabrera (2011) argued that the NSSE is made up of strong theoretical grounding, but there had been little work to investigate the validity of the NSSE's five benchmarks and the extent that they predict student outcomes. Finally, Culver, Tendhar, and Burge (2013) found that the NSSE isn't perfect and should be adapted to fit the research. Therefore, this research and knowledge was taken into consideration when using the NSSE's data for this study.

The second limitation of this study was the self-reported letter grades. The NSSE only gathered data on students' self-reported letter grades. The survey did not ask for a percentage. Also, the survey did not gather the students' academic results directly from the institution. Therefore, some students may have lied on the survey or they might not remember their grades. A grade letter may not be as accurate and exact as a percentage. For example, some letter grades such as A and A+s can represent a GPA of 4.0 or a percentage in the range of 93-100. Also, some students might not remember their overall grade average. GPA is a common and well-known measure of academic success in the NCAA. The NCAA's academic eligibility is measured by GPA. Therefore, this is an important measure when analyzing student-athletes' academic success and some students may only care about their GPA and not know how to convert that number to a letter grade.

The third limitation of this study was how the survey classifies time spent on cocurricular activities. The survey question not only included time spent on sports, but also time spent on organizations, campus publications, student government, fraternity or sorority, intercollegiate or intermural sports. Therefore, the student-athletes' response could have included other time spent on activities and the time they spend on their sport.

Therefore, this factor was taken into consideration when analyzing the data and discussing the findings of the study.

Significance

Since its inception in 1906, the NCAA has undergone reform to improve the organization's dedication to athletic success and college student-athletes' academic success (The Official Site of the NCAA, n.d.). The data used in this study focused on whether or not race, type of sport played, gender, time spent preparing for class and time spent participating in cocurriculars have a relationship with NCAA student-athletes' academic success. This research can be used to help ensure that college student-athletes continue to achieve academically, and it may also provide insight into factors affecting college student-athletes' academic success. This research could help gain insight into two major areas of concern within the NCAA: factors affecting academic eligibility and student-athlete time commitments.

This research may have produced useful information and data for the NCAA and its members, individual institutions, athletic directors, coaches, student-athletes, academic advisors, and researchers with recent research on the issues. The information could be used to discover which type of student might need more academic support. Helping improve the academic outcomes of college student-athletes may also help society because it could increase the chances that students are learning, graduating, not wasting federal aid or being crippled by student debt, and continue being contributing positive members of our society.

Summary

In this chapter, I introduced the study, provided an explanation of the problem being investigated, and outlined the purpose of the study. Background information on the NCAA and their academic eligibility requirements was presented. I sumarized that the purpose of this nonexperimental, quantitative research was to determine to what extent engagement, race, type of sport played, and gender predict student-athletes' academic success. I discussed the theoretical framework guiding this research and the data source. Assumptions, delimitations, and limitations of the study were listed. Finally, I outlined the significance of the study and how the study may affect positive social change.

In Chapter 2, I provide an overview of the liturature research stratgeies used to gather exsisting liturature. Also, I provide an indepth discussion on the theoretical framework for this study as influenced by Astin's (1984) student involvement theory and Kuh's (2009a, 2009b) concept of engagement. Finally, Chapter 2 contains the empirical literature review and discusses topics such as, measuring academic success, GPA the effects of athletic, student engagement in athletics, the use of the NSSE survey data and how college students spend their time.

Chapter 2: Literature Review

My purpose in this quantitative research was to determine to what extent academic and cocurricular engagement as represented by time spent on cocurricular activities and time spent preparing for class, race, type of sport played, and gender predict NCAA student-athletes' academic success. Therefore, for this study, I focused on NCAA student-athletes who participated in the 2018 NSSE survey across 461 campuses. The main RQ focused on the increasing pressures college student-athletes are under and a lack of recent research. Also, the NCAA is frequently changing its policies and those changes may affect the student-athletes' academic success. For example, the NCAA has recently changed the requirements for time-off from athletics for students. The other issue within the NCAA is understanding academic eligibility. I was unable to find recent studies that demonstrate how demographic variables or engagement variables are related to academic success. Most of the data focused on comparing nonathlete students with student-athletes. Therefore, the sub RQs focused on the extent that race, gender, type of sport played, time spent preparing for class, and time spent participating in cocurriculars predict NCAA student-athletes' academic success as measured by a self-reported grade of C or higher. After beginning the analysis, the standard was raised to a self-reported grade of B or higher.

To begin, Chapter 2 is composed of a description of the search strategy for assembling empirical studies for review, a review of the theoretical framework for the research, and a review of empirical literature.

Literature Search Strategy

The research studies that I selected for this literature review focused on the relationship between athletics and academics. The databases used to find research were Education Research Complete (now known as Education Source), ERIC – Educational Resource Information Center, Google Scholar, SAGE Publications, EBSCO, and Academic Google Search. The following online journals were reviewed for online research articles: *Educational Research and Reviews, Journal of Research in Education, Journal of Sport and Social Issues, Youth & Society, Journal of Sports Economic, Health Education Journal, Journal of College Student Personnel, College Student Journal, Journal of College Student Development, Journal of School Health, The Review of Higher Education, Sociology of Sport Journal, Journal of Education and Social Policy, Journal of College and Character, Education and Urban Society, Youth & Society, Journal of Leadership & Organizational Studies, Research & Evaluation, Journal of Student Affairs Research and Practice,* and *International Journal of Higher Education*. I also consulted the NCAA's organizational website. Overall, I attempted to review current research, however some seminal works were included, so the range of dates for the studies is between 1975 and 2018. The majority of the research is from the last 5 years.

The following keyword and Boolean phrases were entered: *athletics and education, measuring student success, athletics and GPA, sports and academic success, academic success, NCAA student success, NCAA measuring success, NCAA GPA, GPA, student-athlete GPA, college and athletes, higher education and athletic success, student-athlete measuring success, engagement, student-athlete engagement, NSSE and* *engagement*, *NSSE and student-athletes*, *NSSE validity*, *NSSE, Astin, student involvement theory, student involvement,* and *student-athlete involvement, Astin I-E-O model, Kuh, Kuh's concept of engagement,* and *engagement and athletics*. Upon finding useful research articles, an additional search of the articles' reference lists yielded more articles. I also used Google Scholar to review citations in key articles to find additional relevant research.

Theoretical Framework

The theoretical framework for this study was influenced by Astin's (1984) student involvement theory and Kuh's (2009a, 2009b) concept of engagement. In this section, I outline the key components of each concept and argued their relevance to this research. Both involvement theory and the concept of engagement have overlapping ideas about how involvement and engagement have a positive effect on students and how they can be used analyze students. However, there are also key differences between the two concepts. Wolf-Wendel, Ward, and Kinzie (2009) have suggested that a student can be involved and not be engaged and that researchers can use the concept of engagement to help improve the way institutions collect and use data on engagement to make changes to their institutions. I explore these concepts in this section. I also explore involvement theory and the use of the concept of engagement in recent research on student-athletes and collegiate athletics.

Astin's Student Involvement Theory

In Astin's (1984) student involvement theory, active student participation is viewed as an important aspect of the learning process in higher education. Astin stated that student involvement is the amount of physical and psychological energy that students give to their academic experience. For example, a student who is highly involved might dedicate a lot of energy to studying, participate in student organizations, spend a lot of time on campus, and interact with their classmates and faculty members. A student who is not highly involved might neglect their schoolwork, not involve themselves in extracurricular activities, spend very little time on campus, and have little contact with their fellow classmates and faculty members. Astin stated that there can be a wide range of involvement level and type of involvement (Astin, 1984).

Astin (1984) stated that his theory of involvement is similar to the Freudian concept of cathexis which Astin described as people investing their energy in objects and persons outside of themselves. Individuals can cathect on their jobs, schoolwork, family, and friends. Astin also stated that the involvement concept is similar to learning theorists' concept of vigilance or time-on-task. The concept is also similar, although less so, to the term *involvement* (Astin, 1984).

Astin (1984) stated that involvement is an active term. He stated that involvement is behavioral in meaning such as take on, go in for, or engage in. However, involvement also includes words that are interior in nature, such as accentuate, care for, or value. Astin claimed that motivation is important in involvement, but "it is not so much what the individual thinks or feels, but what the individual does, how he or she behaves, that defines and identifies involvement" (Astin, 1984, pg. 519).

Astin's (1984) involvement theory has five basic postulates. The first stated that involvement is the investment of psychological and physical energy in different objects.

The objects can be either generalized or specific. The second stated that regardless of the object, involvement happens along a continuum. Different students will manifest different levels of involvement in the object. Also, the same student may manifest different levels of involvement in different objects at different times. The third stated that involvement can be both quantitative and qualitative. The fourth stated that the quality and quantity of student involvement in a program is directly related to the amount of student personal development and learning associated with educational programs. The last one stated that the effects of educational practices and policies are related to the ability of that practice or policy to increase student involvement (Astin, 1984).

Astin's research. Astin's (1984) theory is rooted in longitudinal data that he collected on college dropouts, involvement, and what makes student stay. Astin's (1975) study used longitudinal data from several samples that included more than 200,000 students. The study examined more than 80 different student outcomes. The study focused on the effects of different involvement, including athletic involvement. The data was analyzed, and it was determined that every significant affect could be rationalized in terms of involvement. It was also determined that every positive factor was likely to increase student involvement and negative factors would reduce involvement and there was a link between students' dropping out and lack of involvement. The study also found that students who join social fraternities or sororities or participated in extracurricular activities of any type were less likely to drop out. He also stated that participation in sports, especially intercollegiate sports, had a positive effect on persistence (Astin, 1975).

Astin's (1975) study showed that there is a link between the right "fit" and students succeeding. For example, Black students were more likely to persist at Black colleges than at White ones. Students from small towns were more likely to persist in small colleges rather than large ones. Students with religious backgrounds were more likely to persist at religious schools than nonreligious. The top reason men dropped out was boredom, which may imply lack of involvement. For women, it was marriage, pregnancy, or other responsibilities (Astin, 1975). Astin (1984) stated the most important conclusion from this study was that all forms of involvement were associated with greater than average changes for the entering freshman characteristics (Astin, 1984).

Astin (1984) did some research on student-athletes and found that students who became highly involved in athletic activities showed a less than average increase in areas like religious apostasy, artistic interests, business interests, and political liberalism. Astin also found that athletic involvement was associated with satisfaction in the intellectual environment, student friendships, the institution's academic reputation, and in institutional administration (Astin, 1984).

In *Four Critical Years: Effects of College on Beliefs, Attitudes, and Knowledge*, Astin (1977) claimed that undergraduate extracurricular activities could be the forerunner of adult achievement. Astin stated for example that many leaders in business, industry, or government were also leaders in college. He also stated that most professional athletes were selected from the ranks of outstanding college athletes. Astin studied extracurricular activities and the likelihood of extracurricular achievement depending of the college. Astin also studied the implications of leadership, journalism, science, creative writing, theater, and athletics in college student development. He claimed there was, at the time, a growing number of students participating in varsity athletics. He found that athletic achievement had a negative effect on achievement in the areas of leadership, journalism, and theater. He also found in 1972, that small institutions, prestigious institutions, and a Northeastern location had positive effects on achievement in athletics whereas large institutions, selective private universities, and public two-way colleges had a negative effect on achievement in athletics (Astin, 1977).

Kuh's Engagement Theory

The theoretical framework for this study is also influenced by Kuh's (2009a, 2009b) concept of engagement. According to Kuh (2009a) the term *engagement* usually represents "constructs such as quality of effort and involvement in productive learning activities" (Kuh, 2009a, pg. 6). Kuh (2009b) argued that student engagement represents the effort and time that student dedicate to activities that are aligned with their desired college outcomes and what institutions do to encourage students to participate in the activities. The concept represents the relationship between desired college outcomes and the amount of effort and time students devote to their studies and other purposeful activities (Kuh, 2009b).

Kuh (2009a) stated that engagement has been a component of educational literature for more than 70 years. He argued that the movement began in the 1930s with Tyler and the concept of time on task and included Astin's theory of involvement. He pointed to the movement continuing into the concept of student engagement with theorists such as Kuh, Schuh, Whitt, and associates and Kuh and others (Kuh, 2009a).

The big shift from the seminal theorists such as Tyler and Astin's ideas was Kuh's focus on the second feature of student engagement, the first feature being the relationship between involvement and development. The second feature is how the institutions allocate resources and curricula, support services, and learning opportunities to encourage purposeful student participation in activities that have a positive association with satisfaction, learning, persistence, and graduation (Kuh, 2009b).

Kuh (2009b) suggested that future research should explore the key factors and features of student participation in different activities that lead to differential outcomes. He also listed participating in cocurricular activities such as sports as an enriching educational experience (Kuh, 2009b). However, besides that mention, I found that cocurriculars or athletics were seldom mentioned or studied through the lens of Kuh's engagement concept in the scholarly resources.

Stirling and Kerr's (2015) literature review explored how to create meaningful cocurricular experiences in higher education using Kuh's concept of engagement and his ideas for creating high-impact practices. The researchers highlighted Kuh's belief that cocurricular programs are an integral part of the student life experience. The benefits of cocurricular participation included:

> self-efficacy, satisfaction, feelings of support and institutional challenge, retention, academic achievement and intellectual engagement, enhanced understanding of others, deepened sense of spirituality, and practical skill acquisition such as interview skills and networking abilities (Stirling & Kerr, 2015, pg. 1).

Engagement and the NSSE. Kuh (2009a) stated that the NSSE was created as an instrument to assess how students engage in educational activities and what they gain from them. He also stated that the NSSE has three core purposes, the first is to provide high-quality data that institutions can use to improve students' experiences. The second purpose is to learn more about and make note of effective educational practices in college settings. This is achieved through ongoing analyses of the survey results and research activities. The third purpose is to advocate for public acceptance and use (Kuh, 2009a).

The NSSE uses survey questionnaires to collect information in five different categories. The first asks questions about students' participation in dozens of purposeful activities. The second asks students about what the institution required of them. The third asks about their perceptions of features of the college environment that are related to satisfaction, persistence, and achievement. The fourth category asks students to provide information about their background. Finally, the last category asks students to estimate their personal and educational growth since beginning college. The areas of growth include intellectual skills, general knowledge, personal, social, ethical, written and oral, and vocational (Kuh, 2009a).

NSSE and validity. Pike (2012); Pascarella et al. (2010); and Miller et al. (2016) all researched and tested the validity of the NSSE survey and NSSE database. The five benchmarks were: level of academic challenge, active and collaborative learning, enriching educational experiences, student-faculty interaction, and supportive campus environment. Pike (2012) found that the NSSE benchmarks provided dependable measures of engagement and that means were also significantly related to institutional outcomes such as graduation rates and retention (Pike, 2013). Pascarella et al. (2010) supported NSSE results on educational practices and student engagement as good measures for growth in areas such as moral reasoning, critical thinking, personal wellbeing, a positive orientation toward literacy activities, and intercultural effectiveness. Miller et al. (2016) found quantitative evidence that supported claims that the engagement indicators were measuring what they intended to measure and that the NSSE had strong construct validity evidence and therefore could be used for assessments.

Using the 2008 administration of the NSSE, Pike (2012) tested the NSSE benchmarks as a dependable measure for institutional and group level decision making and if they were related to institutional-level measures of student academic success. Pike conducted separate generalizability analyses for first year students, senior students, and all students. He Excluded special institutions, students who took all of their courses via distance, and institutions with fewer than 50 first-year or senior students. The researcher analyzed institutional characteristics and the NSSE benchmarks and found that the benchmarks were dependable measures of engagement. Also, the multiple regression results showed that the benchmark scores were related to institutional retention and graduation rates (Pike, 2013).

Pascarella et al. (2010) used the findings from the Wabash study to compare with the NSSE survey. The Wabash study, a longitudinal investigation of the experiences that increase growth in educational outcomes, measured five college outcomes associated with liberal arts. The five outcomes included: effective reasoning and problem solving, moral character, inclination to inquire and lifelong learning, intercultural effectiveness, and personal well-being. Data was collected "from 1,426 first-year students at 19 institutions who took the Critical Thinking Test, 1,446 different first-year students who took the Defining Issues Test, and 2,861 first-year students (including both previous samples) who completed all other measures" (Pascarella et al., 2010, pg. 9). The data was collected from the first-year students enrolled in college for fall 2006 and in the spring of 2007 at the end of their first year. In the fall of 2006, the students completed the seven liberal arts outcome measures. In the spring of 2007, the same students first completed the NSSE and then again completed the posttests of the seven liberal arts outcome measures. The responses were aggregated of the sample at each institution to find an average institution level score for each of the seven liberal arts outcomes assessments and for each of the five NSSE benchmark scales. The study concluded that there was a significant overall positive association between institution-level NSSE benchmark scores and the seven liberal arts outcomes at the end of the first year of college (Pascarella et al., 2010).

Miller et al. (2016) conducted a factor analysis of the NSSE's 10 engagement indicators to confirm that they measure what they are intending to measure. The 10 engagement indicators include: higher-order learning, reflective and integrative learning, learning strategies, quantitative reasoning, collaborative learning, discussions with diverse others, student-faculty interaction, effective teaching practices, quality of interactions, and supportive environment. To do this, they divided all NSSE 2013 respondents into two groups. The first group provided data for the exploratory factor analysis (EFA). The second groups provided data for the confirmatory factor analysis

(CFA). EFA were run separately for first-year students, seniors, and online students. For the CFA, the researchers developed a separate model for all first-year students, seniors, and online students. To analyze the EFA, the researchers used polychromic correlations, included all engagement items, time spent preparing for class, and time spent reading. To analyze the CFA, the researchers used the 10 engagement indicators organized under the categories: academic challenge, learning with peers, experiences with faculty, and campus environment. The researchers found engagement indicators had sufficiently strong construct validity evidence and the evidence supported their use for college assessment efforts (Miller et al., 2016).

However, despite this recent research in support of the NSSE's validity and reliability, there is also research that questions the validity of the NSSE. Most notably, Porter (2011) questioned the validity of typical college student surveys. He claimed that they have minimal validity in the field because they assume college students can report information about their attitudes and behaviors easily despite the fact that survey responses suggest they cannot because some students lie or are not as self-aware as needed. Also, Porter claimed that existing research on college students suggests that the students have problems answering even simple questions about factual information correctly. Finally, Porter stated that much of the cited evidence on validity and reliability has actually shown the opposite, that the NSSE is not valid or reliable (Porter, 2011).

Porter (2011) stated the validity issues with the NSSE were that the NSSE is too broad and driven by empirical concerns rather than theoretical. College students have a hard time encoding and reporting on behaviors and events. According to Porter, the structure of the NSSE's benchmarks are not replicated by researchers and therefore their reliabilities fail to meet the standards. The NSSE has created different scales, which are items group together to measure. The NSSE has created the engagement indicators, and scales to measure satisfaction and perceived gains. Poster stated that there are studies that measured the relationship between NSSE items and scales and external data and found that there was a limited relationship and the scales taken from the NSSE do not correlate with student learning measures. Porter also claimed that the NSSE uses vaguely worded questions, with low reliabilities, and limited associations with data external to the survey (Porter, 2011).

Porter (2011) arrived at his conclusion based on three trends he identified at the time. The first was a lack of training. He claimed higher education programs do not offer courses on survey methodology and therefore, doctoral students, the source of many studies using NSSE data. Also, doctoral students do not know how to properly conduct or analyze surveys. Secondly, he stated that the demand for a quick fix to the issues of how to assess student learning. The final trend was the demands placed on higher education faculty for publications. He also provided his recommendations for surveying college students. First, he suggested that researchers better understand the limited cognitive ability of humans when they are faced with survey questions. This problem includes issues such as: the time they have to answer the questions, questions that appear to contradict theory and research, and that researchers should use time-use diaries rather than surveys. Secondly, he suggested that it is easy to find small correlations between variables, but those correlations can be misleading if they are not analyzed further. He also suggested having some criteria for judging before validation research, that researchers look for evidence of validity that has already be conducted, and that the standard should not be that validity is assumed until proven otherwise, researchers should establish standards such that a *lack* of validity is assumed until proven otherwise (Porter, 2011). Porter's research on the validity of surveys has been cited by many researchers. Therefore, it is important to keep in mind his findings when interpreting NSSE data for this research. However, Porter's findings also date back to 2011 and therefore, it is also important to consider more recent research discoveries. The recent researchers that support the NSSE's validity and reliability include; Pike (2012); Pascarella et al. (2010); and Miller et al. (2016).

Schneider (2009) argued that the NSSE is approved by the Indiana University Center for Postsecondary Research for analysis within an institution. However, the NSSE has often been used for cross-institution comparative analysis. He suggested that the scientific marketplace must ultimately render judgment on NSSE, which may be a slow process. He also found there was a lack of variance in measures and a lack of relationship with graduation rates when comparing institutions. He concluded that the NSSE had been used in situations that it is not suited for and creating false education wisdom based on flawed surveys (Schneider, 2009). However, this research will not compare institutions, nor will it look for benchmarks at one institution across time. This research will use the NSSE data to provide a large sample size across institutions and will mute institutional variability and so enable an understanding of the variables that are the focus of the research study.

Campbell and Cabrera (2011) argued that the NSSE is made up of strong theoretical grounding, but there had been little work to investigate the validity of the NSSE's five benchmarks and the extent that they predict student outcomes. Using 2009 NSSE national data, the researchers' descriptive analyses found that the benchmarked scale of enriching educational experiences was the least reliable benchmark of the five benchmark and in terms of validity and that overall, the data did not link or have a relationship with the five benchmarks. Campbell and Cabrera's (2011) findings questioned how good of a tool the NSSE benchmarks are for appraising institutional quality and if they predict such student outcomes as GPA.

More recently, Culver et al. (2013) also conducted a study to analyze if the NSSE's five-factor model benchmarks was the best fit for student engagement data collection at a large, research-intensive, public, land-grant university. Culver et al. used data from 679 senior students at Virginia Tech in 2008. The five benchmarks include: level of academic challenge, active and collaborative learning, enriching educational experiences, student-faculty interaction, and supportive campus environment. Culver et al. found that the five-factor model did not fit the data sample, as did Campbell and Cabrera's (2011) study. The researchers employed exploratory factor analysis and used ProMax rotation to find a factor structure that would be a better fit. The researchers then revised a model using six factors and 21 of the 42 items and found it was a more valid blueprint. The six factors included: student-faculty interaction, higher-order thinking skill, supportive campus environment, quality of relationship, writing challenge, and diversity. The researchers also tested the updated model on the 2011 sample of 756 senior students from the same university and found that it fit. Culver et al. concluded with the suggestion that this six-factor model is more ideal for any individual institution level. Also, they suggested researchers should study beyond analyzing if the five-factor model fits the data and they should look to develop an alternate set of factor structures that could better represent the data (Culver et al., 2013).

Comparing Involvement Theory and the Concept of Engagement

Wolf-Wendel et al. (2009) stated that Astin's involvement theory had typically been used in research using his Input–Environment–Output (I–E–O) model. Wolf-Wendel et al. (2009) claimed that the main concern with Astin's theory is how the construct of involvement is measured, as student involvement is often measured by membership in student organizations rather than the quality of that involvement. Another issue is that involvement had usually only been applied to traditional age students and not all college students. Other important and unique characteristics about Astin's theory include its emphasis on academics, extracurricular activities, out of the classroom settings, and a focus on the activities that the individual participates in to become involved (Wolf-Wendel et al., 2009).

Wolf-Wendel et al. (2009) stated that the NSSE project inspired and led to Kuh's (2009b) concept of engagement which focuses on two parties engaging in an agreement about educational experiences. Wolf-Wendel et al. (2009) stated that Kuh claimed that student engagement is not an extension of involvement but a concept to show the importance of linking student behavior and successful educational practices. Kuh's construct puts more responsibility on the institution than the student (Wolf-Wendel et al., 2009).

Wolf-Wendel et al. (2009) stated that the main difference between involvement theory and the concept of engagement is that engagement is directly linked to wanted educational outcomes and processes. Another key difference is the belief that it is possible to be involved but not engaged. However, Wolf-Wendel et al. (2009) also claimed that Astin had stated there are no essential differences between the two and that Kuh has stated that he is in partial agreement that there are a lot of overlapping ideas between involvement and engagement (Wolf-Wendel et al., 2009).

Current Research Study

Astin's (1984) theory of student involvement and Kuh's (2009a, 2009b) concept of engagement are applicable to the main RQ. Astin (1984) grouped involvement into three main categories: academic absorption, faculty interaction, and athletic participation. He stated that extracurricular activities, including athletics, were crucial for students to develop peer relationships that increase their institutional commitment. Researchers have applied Astin's theory to student-athletes and their extracurricular activity participation (Elliott, 2009; Iacovone, 2007; Stelzer, 2012; Stirling & Kerr, 2015; Strayhorn, 2008; Webber, Krylow, & Zhang, 2013; York, Gibson, & Rankin, 2015). In Kuh's (2009a, 2009b) national analyses the concept of engagement was measured using the NSSE survey. Some of these studies have also used archival NSSE data (Fosnacht, Mccormick, & Lerma, 2018; Rettig & Hu, 2016; Umbach et al., 2006; Webber et al., 2013) or were influenced by the NSSE survey for their data collection but used a different instrument

(Elliott, 2009; Iacovone, 2007; Stelzer, 2012; Stirling & Kerr, 2015; Strayhorn, 2008; York et al., 2015). The sub RQs are guided by Astin's theory, as well as the existing research utilizing the theory of involvement and its applicability to student-athletes and extracurricular activities. Kuh's (2009a, 2009b) concept of engagement is guiding the use of the NSSE data for this research.

Astin (1984) stated that extracurricular activities were crucial for students to develop peer relationships that increase their institutional commitment. The purpose of this research is to only focus on athletics as the extracurricular activity. Schroeder (2000) claimed that evidence suggested that the time demands at the NCAA Division I level might be the most severe of the three NCAA division levels, but I have found no recent research on time allotment of demanding extracurriculars. Some researchers have found both negative and positive outcomes as a result of the amount of time student-athletes must dedicate to their sports (Fosnacht et al., 2018; Iacovone, 2007). Schroeder (2000) stated that researchers have also found that student-athletes' time commitments can hinder their peer interactions outside of their student-athlete peer group. Schroeder (2000) claimed that this evidence supports Astin's (1984) statement that excessive amounts of involvement in one activity may become counterproductive. Therefore, student-athletes might be spending too much time on their athletics and not engaging in other beneficial activates and this could hinder their academic success (Schroeder, 2000).

Involvement Theory and Engagement Concept and Athletics

Astin's (1984) student involvement theory and Kuh's (2009a, 2009b) concept of engagement have guided research on the effects of involvement or engagement on students. Webber, Krylow, and Zhang (2013) studied if involvement lead to authentic gains in student success. Guided by Astin's theory and using NSSE data, the researchers found that high levels of self-reported engagement in a variety of cocurricular and curricular activities have a significant contribution to student GPA and their perceptions of their academic experiences. Webber et al. (2013) used descriptive statistics to analyze the 1,269 completed survey responses, including 649 first-year students and 620 senior-level students. To measure academic activities, Webber et al. (2013) included number of hours spent studying per week, interactions with faculty after class, capstone activities, books read, and number and length of papers written. The researchers also analyzed if participation in cocurricular activities contributed to student success. The cocurricular activities included were interactions with faculty and staff, community/service projects, and conversations with peers in general and conversations with other students of different racial or religious background. To measure student success the researchers included the cumulative GPA and the student's evaluation of the entire educational experience. These measures and results were taken from the NSSE survey data (Webber et al., 2013).

Webber et al. (2013) found a connection between the frequency of involvement and quality of effort. Students who spent more time studying, participating in community service, and engaged in interactions with faculty reported higher satisfaction with their overall college experience. Students who dedicated more time to involvement reported getting more out of their college experience as well (Webber et al., 2013). This research might indicate that the same satisfaction is possible when students participate in athletics.

Research on involvement and engagement often uses the NSSE database, other researchers have constructed and administered their own surveys. Elliott (2009) and Iacovone (2007) collected their own data on university students to explore involvement and engagement using Astin's theory and Kuh's concepts as the theoretical framework. Elliott (2009) found that students involved in college-sponsored, formal, cocurricular programs had higher satisfaction with their college experience and a higher grade point average. The involved students were also better able to manage emotions, more self-confident, and more emotionally independent from parents. In order for the activity to qualify as a cocurricular program, students had to try out, it had to be funded, faculty or staff supervised, and participants had to attend consistent meetings or were actively involved. The study was grounded in Astin's involvement theory and also relied on Kuh's concepts of engagement. In particular, the author used these concepts to create the basis for qualifying as a cocurricular activity (Elliott, 2009).

Iacovone (2007) conducted a similar study on 99 student-athletes who participated in one of the 16 intercollegiate sports at Rowan University and focused on student-athletes' involvement. There was a significant relationship between student-athletes' cumulative GPA and their involvement in activities. For example, there was a significant positive correlation between a student-athletes' GPA and having a part-time job, participating in an internship, time spent in field experience, relationship with other students, and relationship with their school's faculty. These findings are supported by Astin's (1984) conclusions. Iacovone (2007) also stated that while student-athletes were involved in activities outside of athletics, they were not involved in activities that take up a lot of time (Iacovone, 2007).

Stelzer (2012) tested the claim of research that had found a significant positive correlation between student involvement and students' persistence and academic achievement by surveying 307 Rowan College student-athletes from 19 sports clubs. Stelzer collected data on their background information such as race, gender, GPA, sport, and aspects of involvement. This study was conducted on sports clubs and not on NCAA student-athletes, so the amount of involvement may differ from the focus of the RQ. However, these student-athletes did dedicate the most amount of their time to athletics followed by working with classmates outside of class. These student-athletes' experience, like Astin (1984) suggested they had less time to dedicate to involvement outside of athletics than students who weren't involved in athletics. Stelzer also found weak relationships between demographic variables and involvement in activities. However, there were moderate relationships when it came to gender and involvement and type of sport and involvement (Stelzer, 2012).

York et al. (2015) used Astin's IEO model and argued that college academic success could be understood by analyzing three factors. As explained in the earlier conceptual framework section, the first is inputs which includes family backgrounds, demographic characteristics, and the student's existing social and academic experiences. The second factor is the environment which includes the programs, people, cultures, policies, and experiences encountered in college. The last factor is the outcomes which include the students' characteristics, skills, attitude, values, knowledge, behaviors, and beliefs they have as they leave college (York et al., 2015).

Astin's IEO model has also been used by Strayhorn (2008) to analyze the influence of "good practice" experiences on students' personal and social learning. He collected data from the 2004-2005 national administration of the College Student Experiences Questionnaire. Strayhorn studied the relationship between engagement in meaningful educational activities and the perceived social and personal learning outcomes of college students. He found that faculty-student interactions, active learning experiences, and peer interactions explain 24% of the variance in development. Peer interaction had the strongest relationship with personal and social growth. Strayhorn (2008) used Astin's IEO model to categorize the data. The inputs used included: gender, marital status, age, year in college, and race. The environment factors included: faculty-student interactions, peer interactions, active learning, and selectivity. Outcomes were measured by social and personal development (Strayhorn, 2008).

Conclusion

Astin (1984) concluded that the advantages the involvement theory has over other traditional pedagogical approaches is that it does not focus on the subject matter, rather it focuses the attention on the behavior of the student. Student energy and time are resources in the involvement theory and any institutional practice or policy is assessed based on how it increased or decreases student involvement (Astin, 1984). Astin's theory is strengthened by incorporating Kuh's (2009a, 2009b) concept of engagement. The NSSE project inspired and led to Kuh's concept and his ideas about purposeful engagement, the requirement of two active parties, and new thinking about measuring engagement will all be beneficial when analyzing the NSSE data used in this research.

Empirical Literature Review

In the first section of the literature addressing the theoretical framework, I analyzed Astin's (1984) student involvement theory and Kuh's (2009a, 2009b) concept of engagement to outline the theoretical framework guiding this research. I also discussed how both concepts are related to athletic or cocurricular participation and how they were applied to recent research. Finally, I compared the two concepts and discuss their similarities and differences.

In this section of the literature review, I provide an empirical literature review analyzing three different areas related to the main RQ. First, I explore how researchers have measured academic success and how GPA has been used as a common measure. Second, I explore the effects of athletic participation on academic success, personal, and developmental, as well as the effects of variables such as gender and race on student-athletes' success. Third, I explore student engagement in athletics and the use of the NSSE survey data to analyze engagement and extracurriculars including athletics. Fourthly, I explore research on how college students spend their time, how student-athletes manage their time, and how the NSSE has been used to analyze students' use of time. Finally, I discuss the use of regression to analyze data in the literature.

Measuring Academic Success with GPA

To begin, it is necessary to understand how some people might choose to measure and understand the term *academic success*. York et al.'s (2015) analytic literature review analyzed the operationalization and use of the term “academic success” in multiple academic fields. They analyzed 20 peer-reviewed journal articles and found that 11 of the 20 articles used GPA. GPA as a measure was followed by critical thinking and retention with 19.4%, and engagement and academic skills with 16.1%. York et al. also argued that college academic success could be understood through Astin’s Inputs-Environments-Outcomes (I-E-O) Model which includes three factors. The first is inputs and inputs include family backgrounds, demographic characteristics, and the students’ existing social and academic experiences. The second factor is the environment, including the programs, people, cultures, policies, and experiences encountered in college. The last factor is the outcomes and outcomes include the students’ characteristics, skills, attitude, values, knowledge, behaviors, and beliefs they have as they leave college (York et al., 2015). This research will focus on outcomes, and outcomes will be measured by academic success.

The Effect of Athletic Participation on Academics

Researchers have found that athletic involvement has a positive influence on the lives of students. This positive influence is seen in areas including academics and personal development (Bradley et al., 2012; Castelli et al., 2014; Ferguson, Georgakis, & Wilson, 2014; Hwang, Feltz, Kietzmann, & Diemer, 2016; Kniffin, Wansink, & Shimizu, 2015; Yeung, 2015).

The broadest study I found was a meta-analysis conducted by Castelli et al. (2014) on the relationship between physical activity and academics. The researchers conducted a review using a meta-analytic and qualitative analysis of research from over

45 years. The authors selected 215 articles that met the initial inclusion criteria. The findings suggested that academic performance and physical activity had been investigated as a proxy measure of cognitive health. In 79% of the articles the researchers also found a positive association between physical activity and academic performance. The remaining studies found neutral or null associations (Castelli et al., 2014).

This phenomenon is not localized to the United States; researchers from across the world have also found similar findings. A study done in Ireland by Bradley et al. (2012) found that there was a 25.4-point benefit to the final Leaving Certificate score by participating in sports during the Leaving Certificate years. The highest possible score is 625. Rugby, a team sport, was found to have the strongest correlation to scores with a 73.4-point benefit (Bradley et al., 2012). Ferguson, et al. (2014) analyzed elite athletes' academic achievement at an Australian university compared to the general student population in a school year. The study found that despite the demanding athletic commitments and timetables, the sampled elite athletes performed at levels equal to, or better than, their peers in the general student population. Specifically, they showed a lower failure rate (Ferguson et al., 2014).

Researchers have also found that athletics are not only beneficial for students' academics but benefit their development in other areas as well. Yeung (2015) researched the relationship between athletics, athletic leadership, and academic achievement. Both the literature review and study showed that participation in high school sports had beneficial effects on academic achievement, as measured by cognitive test scores. The benefits were found to be especially high in reading, science, and vocabulary (Yeung, 2015). Kniffin et al.'s (2015) study also found that former student-athletes demonstrate leadership traits and characteristics and report greater personal behavior later in life.

Researchers have studied students of all ages and found that there is a relationship between many types of extracurricular activity involvement and personal development in behavioral areas. Felfe, Lechner, and Steinmayr (2016) studied how extracurricular activities impact the formation of education, health, and behavioral outcomes in children. This German study concluded that sport participation has a positive effect on children's health, behavior, and education. Specifically, their grades and relationships with peers improved. Hwang et al. (2016) also analyzed the relationship between athletics and social and personal influences. The researchers found that students use contextual factors such as parental involvement, peer support in academics and athletics engagement, and significant others' expectations to form their identities. Also, athletic identity and engagement were not adversely related to educational outcomes.

Researchers have analyzed different variables, such as race, division level, sport, gender, and gender and whether or not these variables have an effect on the academic success of student-athletes. Robst and Keil (2000) conducted seminal research on the relationship between athletic participation and academic performance in NCAA Division III student-athletes. Robst and Keil's study at Binghamton University analyzed several variables including whether or not the 9,300 undergraduate and 2,700 graduate students participated in NCAA Division III athletics, GPA, course load ease, female or male, total credits, race, academic level; which of the five schools at the University they were enrolled; academic preparedness as measured by their transfer GPA; and their major. The researchers found that graduation rates were higher for the Division III athletes. The researchers claimed that all other findings related to the other variables were inconclusive or too complex to be interpreted (Robst & Keil, 2000). However, other researchers have been able to find significant variables besides graduation rates in studies on academic success and student-athletes.

Researchers have analyzed whether or not the type of sport, success of a team, or the popularity of the team has any effect on student-athletes' academic success. Bailey and Bhattacharyya (2017) found that the number of times an NCAA Division I school made the top eight positions did not influence the student athletes' academic performance (Bailey & Bhattacharyya, 2017). Ridpath, Kiger, Mak, Eagle, and Letter (2007) analyzed academic integrity and NCAA Division I athletics. The researchers conducted a questionnaire on college athletes from the 13 schools in the Mid-American Conference. The survey was distributed and completed by senior class athletes during the 2001-02 academic year and was comprised of 191 athletes in 27 sports. The data showed that revenue sports performed worse academically than other nonrevenue sports. Routon and Walker (2015) used data from a longitudinal survey of college students from over 400 institutions and found that participation in college sports had a small, negative effect on GPA. However, the negative effects were stronger among males and among football and basketball players, were weaker among top students, and did not differ across race (Routon & Walker, 2015). This research also supported Ridpath et al.'s (2007) findings. Finally, Maloney and McCormick's (1993) found that student-athletes in revenue sports performed worse than any other athletes.

Research relating to the success of a team has led to additional research analyzing if the time of season had an effect on student-athletes' academic success. Schultz (2016) researched if an athlete academically performs better or worse during their athletic season. The author used a time allocation theory of participation to analyze data collected from several larger sub urban Midwestern high schools between the years of 2006-2011. The data included 2,806 in-season observations and 2,794 out-of-season observations, as well as math academic transcript data and student sports participation records from school athletic directors. When comparing athletes versus nonathletes the data showed that athletes, in general, obtained a 0.49-point higher GPA compared to nonathletes, and the data showed the estimated effect of being in-season and out-of-season is approximately 0. Both in-season and out-of-season GPA was 3.04. Therefore, athletes performed no differently academically in-season versus out-of-season (Schultz, 2016).

Some research has analyzed different racial factors affecting student-athletes' success. Bimper (2014) examined the degree to which athletic and racial identity predicted the academic outcomes of African American student-athletes involved in the NCAA Division I Football Bowl Series. Bimper concluded that African American male athletes had much higher athletic identities than White athletes and that a higher measure of athletic identity predicted lower GPA (Bimper, 2014). In an older study, Sellers (1992) researched race differences in the predictors of student-athletes' college GPAs in revenue-producing sports (basketball and football) from 42 NCAA Division I institutions. The findings suggested that there were different predictors of academic achievement for African American student-athletes versus White student-athletes. For example, high school GPA and mother's occupation were the only significant predictors of African American student-athletes' college GPAs (Sellers, 1992). Yeung (2015) found that even though athletic participation has a positive effect on student-athletes' academic success, the benefits are not equal for White and African American students. White males benefitted more than African American and Hispanic athletes, as well as men more than women (Yeung, 2015).

Research on gender has found that women on top athletic teams academically outperformed men on top athletic teams (Bailey & Bhattacharyya, 2017). Ridpath et al. (2007) analyzed academic integrity and NCAA Division I athletics. The data showed that women had higher performances in ACT score, SAT score, core course GPA, and current college GPA. This was consistent with other research that the males involved in revenue sports performed worse than females involved in revenue sports and students in other nonrevenue sports (Ridpath et al., 2007).

Engagement and Athletics

Researchers have explored the role of engagement in academic success. The NSSE is often used when researching engagement and especially when researching student-athletes, drawing on students' self-reported behaviors, how they spend their time, and what they engage in on and off campus. Rettig and Hu (2016) and Umbach et al. (2006) both used NSSE data to analyze engagement and educational outcomes, finding that athletes and nonathletes had similar levels of academic engagement but that nonathletes experienced higher academic achievement than high profile student-athletes. Female athletes were slightly more likely to interact and engaged academically (Umbach et al., 2006). Woods, McNiff, and Coleman (2018) found that spending time working on homework, perceiving a higher institutional expectation for their academic performance, and preparing for a class were most engaging for African American student-athletes (Woods et al., 2018). Gayles and Hu (2009) found that student-athletes reported interacting with students other than teammates more often than any other type of engagement and that it had a positive impact on personal self-concept and learning and communication skills (Gayles & Hu, 2009).

Researchers have also found that athletic participation may have negative effects on student-athletes. As Martin (2009) stated, through his literature review, he found that student-athletes primarily engaged with other student-athletes. Martin stated that this peer conflict can cause academic issues in three areas. The first is that it may discourage them putting effort into their academics. The second is that they are exposed to distractions that make it difficult for them to study. Lastly, it influences them to not seek out and associate with nonstudents-athletes who could help them.

Martin (2009) also stated that there was fear, conscious, and unconscious prejudicial behaviors and attitudes and stereotypes towards student-athletes from members of the campus community. These manifest through professors holding negative attitudes towards student-athletes compared to nonathletes, faculty being surprised when student-athletes achieve academically, and underestimating student-athletes' preparedness and willingness to work hard in the classroom. He stated that it is important that these myths are debunked because student-athletes are more likely to succeed academically when they have relationships, interactions and engagement with faculty (Martin, 2009).

Zacherman and Foubert (2014) conducted a relevant study using NSSE data to explore the relationship between engagement in cocurricular activities and academic performances while exploring gender differences. The two research questions guiding their study were: “Do successively higher numbers of hours per week involved in cocurricular activities have a significant relationship with undergraduate GPA? And, will men and women differ in the pattern of their relationship between involvement and GPA?” (Zacherman & Foubert, 2014, pg. 161). Their population sample included 20% random sample of the respondents from the 2006 NSSE, consisting of 50% first-year students and 50% seniors. Also, 75% of the sample were Caucasian, 7% were African American, 4% Asian/Pacific Islander, 5% Hispanic and the remaining 8% were other and from unknown backgrounds. The researchers included the survey questions on hours spent on cocurricular activities and self-reported letter grades. They converted the letter grades into GPA. Therefore, when asked about their grades, respondents were given the choices of A, A-, B+, B, B-, C+, C, and C- or lower. The responses were converted into a GPA on a 4.0 scale. “A became 4.0, A- became 3.67, B+ became 3.33, B became 3.0, B- became 2.67, C+ became 2.33, C became 2.0, and C- or lower, became 1.67” (Zacherman & Foubert, 2014, pg. 161).

Zacherman and Foubert (2014) determined the linearity of the relationship between men and women. A factorial ANOVA tested the effects of gender (male, female) and cocurricular involvement (seven categories of hours per week) on academic performance. The researchers found statistical significance showing a difference between men and women. They concluded that women performed better when they were involved in cocurricular activities. Also, men's academic performance improved with up to 10 hours per week of involvement in cocurricular activities. However, there was a decrease in men's GPA with higher levels of involvement. Finally, women performed better than men academically (Zacherman & Foubert, 2014).

Student Use of Time

Researchers have also taken a more specific and focused approach to researching student-athletes and engagement by analyzing how students spend their time. Fosnacht, Mccormick, and Lerma (2018) used NSSE data to explore how first-year students spend their time. The researchers categorized the different survey responses into different type of student time expenditures. The categories were preparing for class, working for pay, relaxing and socializing, cocurricular activities and community service, dependent care, and commuting to campus. The researchers identified four-time usage patterns that had a positive relationship with learning and development. The patterns were titled balanced, involved, partiers, and parents. Gender, expected major field, on-campus residency, age, Greek-life membership, and standardized test scores were predictive of students' time use patterns (Fosnacht et al., 2018). While this data does not focus on athletics, it does focus on student involvement and how students balance involvement and education.

Researchers have also studied student-athletes and time management. Rothschild-Checroune, Gravelle, Dawson, and Karlis, (2012) conducted a small qualitative study on 32 first-year Canadian university varsity athlete football players. In 2009, semi-structured interviews were conducted to analyze their time commitments as athletes. The researchers found that the student-athletes stated that time management was the most difficult aspect of being a varsity athlete, that they had to spend more than 40 hours a week on football, and that their commitment to football left little time for academics (Rothschild-Checroune et al., 2012). Burcak, Levent, and Kaan (2015) also found that student-athletes struggle to balance their athletic commitments and academics. The researchers compared 191 college student-athletes and nonathletes using a time management questionnaire. They found that nonathlete students were more successful than student-athletes at time management and time planning (Burcak et al., 2015).

More general research by Welker and Wadzuk (2012) has focused on how students spend their time. They analyzed students perusing a Bachelor of Science in civil engineering at Villanova University. The researchers collected data in 2005, 2008, and 2010 from the Higher Education Research Institute surveys, end-of-semester course surveys, the recommended curriculum for each semester, and time logs (each sample contained approximately 50 students). The researchers found that the number of time students devoted to their schoolwork fluctuated throughout the years. They also found that students spent approximately 3–4 hours a week on their schoolwork outside of class and approximately 1–1.25 hours outside of class for every hour spent in class. Additionally, the time-log and Higher Education Research Institute survey data showed that students were spending a significant amount of time on leisure activities, and not on extracurricular activities or paid work (Welker & Wadzuk, 2012). In 1991, Wade conducted a similar analysis on 367 college students. She found that 82% of the students spend less than 20 hours a week on studying, 25% of the students reported not spending any time in the library, 43% worked, and 86% worked less than 20 hours a week, and 39% participated in intramural sports, and 66% spend two or fewer hours per week in intramural sports (Wade, 1991). While this research is dated, the results on the amount of time students spend on schoolwork is similar to Welker and Wadzuk (2012).

Regression Analysis

Many of the researchers whose studies I have reviewed for this chapter used statistical regression to analyze their data (Bimper, 2014; Bradley et al., 2012; Burcak et al., 2015; Ferguson et al., 2014; Fosnacht et al., 2018; Hwang et al., 2016; Kniffin et al., 2015; Rettig & Hu, 2016; Ridpath et al., 2007; Umbach et al., 2006; Wade, 1991; Webber et al., 2013; Welker & Wadzuk, 2012; Woods et al., 2018; Yeung, 2015). Stryk's (2018) dissertation focused on measuring and analyzing academic success. Specifically, the study examined whether a change in policy and practices for student placement into online developmental mathematics courses could improve predicting the likelihood of student success. The variables used were student success (dependent), modality (independent), and the composite placement score (independent), which consisted of reading comprehension and math proficiency. For this study, academic success was defined as earning a grade of A, B, or C because those would allow the student to enroll in the next course in the sequence. Logistic regression was used to analyze archival data from a student population of 39,585 students. From the total population, 767 participants were identified using stratified random sampling (Stryk, 2018).

Stryk (2018) stated that the study had one dichotomous independent variable, three continuous independent variables and one dichotomous categorical independent variable. The researcher used the Box-Tidwell procedure to test the assumption that a linear relationship exists between the continuous predictor variable and logit (log odds). Stryk (2018) looked at the correlation coefficients and tolerance/VIF values to test for can multicollinearity. The researcher used binary logistic regression results to build the models for predicting the likelihood of student success. The researcher also used goodness-of-fit measures and the Cox & Snell R^2 and /or Nagelkerke R^2 to see strength or explain variance in the dependent variable. I did not focus on student-athlete in this study. However,I did focus on academic success in a similar lens. The way Stryk (2018) has used logistic regression is similar to the way I conducted this study (Stryk, 2018).

Stryk (2018) also made mention of Laerd Statistics (2015b). Laerd Statistics stated that a logistic regression model has seven assumptions. The first four are relate to the design and include: (a) use of a dichotomous outcome (dependent) variable, (b) at least one predictor (independent) variable that is continuous (c) categories of both the outcome and predictor variables are mutually exclusive and exhaustive, and (d) use of at least 15 to 50 cases per independent variable. The other three assumptions are related to the data. There assumptions include: (a) a linear relationship between predictor and logit; (b) no multicollinearity among the predictor variables; and (c) no influential data points, such as high leverage points, or significant outliers (Laerd Statistics, 2015b). These assumptions guided and informed the logistic regression analysis.

Summary

Researchers have already investigated the positive influence that athletic participation has on academic performance (Aljarallah & Bakoban, 2015; Bowen & Greene, 2012; Bradley et al., 2012; Castelli et al., 2014; Insler & Karam, 2017; Schultz, 2016; Yeung, 2015). In particular, researchers have focused on NCAA student-athletes and race, division, gender, in-season versus out of season athletic participation, and major. Much of that research was inconclusive or showed little relationship between the listed variables (Beron & Piquero, 2016; Bimper, 2014; Robst & Keil, 2000; Schultz, 2016).

Umbach et al. (2006) used data from the NSSE database to research how educational experiences of college student-athletes and if there was a relationship between the level of competition (NCAA division, NAIA membership) and engagement. The researchers found, like Rettig and Hu (2016), that athletes and nonathletes were equally engaged with their academics. Female athletes were slightly more likely to interact and to engage academically. They also found that the nature and frequency of student-athlete engagement did not differ among institutions, that male student-athletes earned lower grades than nonstudent athletes, and the effect of being a student-athlete on grades does differ significantly by institution (Umbach et al., 2006).

In light of the increasing pressures college student-athletes are under, it was surprising that no recent studies were identified that replicate, affirm, or challenge findings from Umbach et al. (2006) study. Also, the NCAA is frequently changing its policies and those changes may affect their student-athletes' academic success. For example, the NCAA has recently changed their requirements for time-off from athletics for students. Student-athletes have also indicated that time management is the most difficult aspect of being a varsity athlete (Rothschild-Checroune et al., 2012). The other issue within the NCAA is understanding academic eligibility. I was unable to find recent studies that demonstrated how demographic variables or engagement variables are related to academic success. Most of the data focused on comparing nonathlete students with student-athletes.

The majority of the research explored for this review used quantitative data (Bimper, 2014; Bradley et al., 2012; Burcak et al., 2015; Fosnacht et al., 2018; Hwang et al., 2016; Kniffin et al., 2015; Rettig & Hu, 2016; Ridpath et al., 2007; Wade, 1991; Webber et al., 2013; Welker & Wadzuk, 2012; Woods et al., 2018; Umbach et al., 2006; Yeung, 2015). Ferguson et al., (2014) used a mixed method approach and Schultz (2016) and Rothschild-Checroune et al. (2012) used a qualitative approach. York et al. (2015) conducted an analytic literature review and Castelli et al. (2014) conducted a meta-analytic and qualitative analysis of research from over 45 years. Researchers used the NSSE database to explore engagement, in particular engagement among student-athletes (Fosnacht et al., 2018; Rettig & Hu, 2016; Umbach et al., 2006; Webber et al., 2013; Woods et al., 2018). Other researchers used different data bases. Yeung, (2015) used the High School and Beyond Survey, sophomore cohort, published by the National Center for Education Statistics (NCES), Hwang et al. (2016) used the National Education Longitudinal Survey-88 (NELS), and Welker and Wadzuk (2012) used Higher Education Research Institute survey (HERI). Many of the researchers used statistical regression to analyze the data (Bimper, 2014; Bradley et al., 2012; Burcak et al., 2015; Ferguson et al., 2014; Fosnacht et al., 2018; Hwang et al., 2016; Kniffin et al., 2015; Rettig & Hu, 2016; Ridpath et al., 2007; Umbach et al., 2006; Wade, 1991; Webber et al., 2013; Welker & Wadzuk, 2012; Woods et al., 2018; Yeung, 2015).

Based on the current research, gap in research, and the past methods used by researchers, I used quantitative NSSE data on student-athlete engagement, race, type of sport played, and gender. In this study I also conducted a logistical regression to analyze the data.

Chapter 3: Research Method

My purpose in this quantitative research was to determine to what extent academic and cocurricular engagement as represented by time spent on cocurricular activities and time spent preparing for class, race, type of sport played, and gender predict NCAA student-athletes' academic success. There was a gap in research on college student-athletes and the relationship between their demographic factors (race, type of sport played, gender), academic success (as measured by self-reported grades), and engagement (as measured by how student-athletes spend their time). The data provided insight into whether or not there were differences regarding NCAA student-athletes' academic success, their race, their gender, the type of sport played, and how student-athletes allocate their time amongst different academic and cocurricular and athletic engagements. Academic success was measured by a letter grade of C or greater.

The main RQ focused on understanding engagement, race, type of sport played, gender, and self-reported grades of NCAA student-athletes. In this chapter, I summarize the research design and rationale, methodology, threats to validity, and ethical procedures.

Research Design and Rationale

In this study, *academic success* was defined as a letter grade of C or higher (after beginning the analysis, this standard was raised to a self-reported grade of B or higher). Therefore, I sought to identify if student-athletes' engagement, gender, and/or race predict their academic success. I employed a quantitative paradigm and nonexperimental research design using data from an existing database, the NSSE's 2018 survey on student engagement. The independent variables used for this study were the students' gender (male or female), race (American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or Other Pacific Islander, White, Other), type of sport played, time spent on cocurricular activities (including organizations, campus publications, student government, fraternity or sorority, intercollegiate or intramural sports), and time spent preparing for class (including studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities). The dependent variable was self-reported grades (A, A-, B+, B, B-, C+, C, C- or lower) (see Table 2 for all independent and dependent variables). The choice of variables was based on the current research and a gap in existing research and availability of survey questions that could be used to address these factors of interest/to operationalize these variables. I used archival quantitative NSSE data on student-athlete engagement and the data was analyzed through logistic regression analysis using SPSS.

Table 2

Independent and Dependent Variables

Variable type	Survey question	Answers
Independent variable	Gender	Male/Female
	Race	American Indian or Alaska Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or Other Pacific Islander, White, Other, or "I prefer not to respond."
	Time spent preparing for class	0, 1-5, 6-10, 11-15, 16 -20, 21-25, 26-30, more than 30
	Time spent on cocurriculars	0, 1-5, 6-10, 11-15, 16 -20, 21-25, 26-30, more than 30
	Type of sport played	Baseball, basketball, bowling, cheerleading or dance/pom squad, cross country, fencing, field hockey, football, golf, gymnastics, ice hockey, lacrosse, riffle, rowing, skiing, soccer, softball, swimming & diving, tennis, track & field, volleyball/beach volleyball, water polo, wrestling, other, more than one team selected.
Dependent variable	Self-reported grades	A, A-, B+, B, B-, C+, C, C- or lower.

To understand relationships among variables in the sub RQs, (e.g., engagement, race, gender, type of sport played) I used:

- Regression: A regression analysis can be used to estimate the relationship among variables. For example, logistic regression analysis could be used to make predictions based on the variables.“Logistic regression predicts the probability that an observation falls into one of two categories of a dichotomous dependent variable based on one or more independent variables that can be either continuous or categorical” (Binomial Logistic Regression using SPSS Statistics, n.d.).

The majority of the research explored in the literature review used statistical regression to analyze the data (Bimper, 2014; Bradley et al., 2012; Burcak et al., 2015; Ferguson et al., 2014; Fosnacht et al., 2018; Hwang et al., 2016; Kniffin et al., 2015; Rettig & Hu, 2016; Ridpath et al., 2007; Wade, 1991; Webber et al., 2013; Welker & Wadzuk, 2012; Woods et al., 2018; Umbach et al., 2006; Yeung, 2015). Logistic regression was used when researcher(s) analyzed the effect of one variable on the dependent variable. For example, how the level of engagement predicted grades. Specifically, Bimper (2014) examined how athletic and racial identity predicted the academic outcomes. For the research study, logistic regression was used to analyze SRQ1, SRQ2, SRQ3, SRQ4, and SRQ5.

Time constraints for this design choice included:

- Following proper IRB protocol, and obtaining approval to commence data collection.
- Submitting a formal request for data from the NSSE.

- Completed and send a request for specific data from NSSE.
- Waiting to receive data from the NSSE.

Instrumentation

I used secondary data collected by NSSE for this research. There are two general approaches for analyzing secondary data, research question driven, and data driven. This study was research question driven. I had a research question in mind and then found an existing data set that would fit the area of study and answer the sub RQs (Cheng & Phillips, 2014). I also chose to use NSSE data because it substantively aligned with the research problem.

I used data from the NSSE because it was a convenient, practical, and realistic option for data. Practically, schools do not typically release this type of demographic data and grade information on their students for confidentiality reasons. The NSSE offers data on variables I am interested in for this research on a large number of students. If I had my pick, I might have specified other variables, but I have found satisfactory match between constructs and concerns in the literature review and research problem and the available data. The NSSE is an established survey that has its own IRB and adheres to ethical standard, which I discussed later in this chapter. Also, as Cheng and Phillips (2014) pointed out in their discussion of secondary data, secondary data usually costs less for the researcher and the data comes packaged to the researcher user friendly and organized.

Survey research enables a variety of methods to recruit participants, collect data, and utilize different methods of instrumentation. Surveys are often used to explore human behavior. Survey research also has the ability to include a large population-based data collection, with the ability to obtain information describing characteristics of a large sample of participants. Surveys also enable the ability to obtain a sufficient sample that is representative of the population of interest (Ponto, 2015). In 2018 461 schools participated in the NSSE survey.

This research design was consistent in the choice of variables and research design with other designs in the literature review including both research on student-athletes (Beron & Piquero, 2016; Bimper, 2014; Robst & Keil, 2000; Schultz, 2016) and research that used NSSE data (Fosnacht et al., 2018; Rettig & Hu, 2016; Webber et al., 2013; Woods et al., 2018; Umbach et al., 2006). Also, the majority of the research explored for this review used statistical regression to analyze the data (Bimper, 2014; Bradley et al., 2012; Burcak et al., 2015; Ferguson et al., 2014; Fosnacht et al., 2018; Hwang et al., 2016; Kniffin et al., 2015; Rettig & Hu, 2016; Ridpath et al., 2007; Wade, 1991; Webber et al., 2013; Welker & Wadzuk, 2012; Woods et al., 2018; Umbach et al., 2006; Yeung, 2015). This quantitative research design was the proper fit for the sub RQs. Existing research had been conducted using similar methods, similar framework, including the use of NSSE data. Fosnacht et al. (2018) used NSSE data to explore how first-year students spend their time. The categories included in this study were preparing for class, working for pay, relaxing and socializing, cocurricular activities and community service, dependent care, and commuting to campus (Fosnacht et al., 2018). Rettig and Hu (2016) studied a sample of first-year college students using the NSSE database to compare engagement, educational outcomes, and the relationship between engagement and educational outcomes for student-athletes (Rettig & Hu, 2016). Webber et al. (2013) used descriptive statistics to analyze NSSE data including: the number of hours spent studying per week, interactions with faculty after class, capstone activities, books read, and number and length of papers written, cocurricular activities, and cumulative GPA (Webber et al., 2013). Finally, Umbach et al. (2006) used data from the NSSE database to research how educational experiences of college student-athletes and if there was a relationship between the level of competition (NCAA division, NAIA membership) and engagement. Their research included data on participation in cocurricular activities, gender, and grades (Umbach et al., 2006).

Methodology

For this study, it is important to know the process used in collecting data from NSSE was just as important as the processes used by NSSE to collect the initial survey data. Indiana University School of Education Center for Postsecondary Research collects, analyzes, and distributes their student data for the purpose of conducting internal research and so that others can used the data for ethical research. The following sections describe the methods that were used for this research study.

Population

The methodology used for this research included archival existing survey data from the NSSE database. NSSE’s target population was broader than mine and includes undergraduate first year and senior students from 4-year post-secondary schools that have chosen to participate in the survey. For the purpose of this research, I included NSSE data from 2018 on NCAA student-athletes. The sample included undergraduate first-year student-athletes of different races, type of sport played, and gender.

Sampling Procedure

The NSSE launched in 2000 and was updated in 2013. The survey collects self-reported information in five categories:

> (1) Participation in dozens of educationally purposeful activities, (2) institutional requirements and the challenging nature of coursework, (3) perceptions of the college environment, (4) estimates of educational and personal growth since starting college, and (5) background and demographic information (NSSE – National Survey of Student Engagement, n.d.).

The NSSE collects information from hundreds of 4-year colleges and universities (the number varies from year to year). The NSSE gathers information from first year and senior students' participation in activities and programs provided by the institution for learning and personal development. Therefore, the NSSE organization claims that the data from their survey may provide information on how students spend their time and what they gain from attending college (NSSE – National Survey of Student Engagement, n.d.).

The survey is administered and assessed by Indiana University School of Education Center for Postsecondary Research. The survey is called The College Student Report. The survey items on this report empirically confirmed "good practices" under graduation education and reflect behaviors that are related to the desired outcomes of college (NSSE – National Survey of Student Engagement, n.d.). The electronic survey is available for students on their phones, tablets, or computers. The questionnaire is made up of mostly multiple-choice questions, but also Likert and scale questions, and a couple close ended, fill in the blank questions. The questions on time spent on cocurricular activities and time spent preparing for class are measured using ordinal scales. The questions on gender, gender, and grades are measured using nominal scales. Students are first given an informed consent sheet with the NSSE's contact information. They are then given the choice to complete the survey or decline it. They also have space at the end of the survey to add their own comments and concerns. Since this questionnaire is also administered in Canada, there are four versions of the survey. There is a U.S. English, U.S. Spanish, Canadian English, and Canadian French. The Appendix is a list of the survey questions and possible responses I chose to include form the survey for the RQs. The full 2018 U.S. English NSSE survey can be found on the NSSE website.

I believe the 2018 NSSE survey was a trustworthy survey. Administering the NSSE requires a collaboration spanning 12 months between the NSSE staff and participating campuses. Schools are assigned a project services team and they work together to help the school administer the survey to their students. NSSE provides a secure web portal for uploading files and other materials related to the survey and administering the survey. The entire process works on a 12-month cycle. The NSSE collects the data from the students and creates multiple reports from the data. Participating institutions receive a variety of reports that compare their students' responses with students from a self-selected group of comparison institutions (NSSE – National Survey of Student Engagement, n.d.).

I ran a priori analysis, using G*Power 3.1, that indicated the need for a sample size between 29 and 782 (depending on the odds ratio of small, medium, or large) for an α = .05 and power (1- β) = .95. This research used nonprobability sampling and a large data set. Therefore, I was not worried about the need to conduct a power analysis. For this study, alpha was set to .05 and power to .80. This setting is the standard educational setting for a medium effect size and appropriate for the larger sample size (McDonald, J.H, 2014).

Validity and Reliability

Researchers have explored and tested the validity and reliability of the NSSE and its ability to be used for research on student engagement (Miller et al., 2016; Pascarella et al., 2010; Pike, 2012). Pike (2012) found that the NSSE benchmarks provided dependable measures of engagement and that means were also significantly related to institutional outcomes such as graduation rates and retention (Pike, 2012). Pascarella et al.'s (2010) research supported NSSE results on educational practices and student engagement as good measures for growth in areas such as moral reasoning, critical thinking, personal wellbeing, a positive orientation toward literacy activities, and intercultural effectiveness. The reliabilities of the seven measures averaged .82 (Pascarella et al., 2010). Miller et al. (2016) found quantitative evidence that supported claims that the engagement indicators were measuring what they intended to measure and that the NSSE had strong construct validity evidence, and therefore could be used for assessments. Therefore, in this research study, I am assuming the NSSE is credible and will provide the best available data to address the sub RQs.

Threats to Validity

It is important to consider external and internal threats to validity when conducting research. External validity has been described as the extent to which the results of a study are generalizable across and to populations, times, and settings. While internal validity has been described as the conditions that observed differences on the dependent variable are a direct result of the independent variable and not another variable. Therefore, the validity is threatened by a plausible alternative explanation that cannot be eliminated. High internal validity does not eliminate external threats (Onwuegbuzie, 2000). Onwuegbuzie (2000) summarized eight threats to internal validity that included, history, maturation, testing, instrumentation, statistical regression, differential selection of participants, mortality and interaction effects. Additionally, external validity threats may include issues in the area of population validity, ecological validity, and external validity of operations. Threats to internal and external validity do not only affect experimental designs. Threats to validity should be assessed in all research studies, regardless of their designs (Onwuegbuzie, 2000).

External Validity

Threats to validity are present when conducting research. For this research, threats to external validity included the selection of target population. The results should be generalizable to the population. To ensure that, I received appropriate data on the target population, and I completed a data sharing agreement with NSSE outlining the specific data needed. I also worked with NSSE to ensure students remained anonymous and all personal identifiers were removed.

Another threat to external validity could have been the analysis. To ensure there was no bias in the analysis and interpretation of the data, I choose to conduct a quantitative study that used logistic regression. I have found that these methods are the most appropriate based on the review of recent and relevant research (Bimper, 2014; Bradley et al., 2012; Burcak et al., 2015; Ferguson et al., 2014; Fosnacht et al., 2018; Hwang et al., 2016; Kniffin et al., 2015; Rettig & Hu, 2016; Ridpath et al., 2007; Wade, 1991; Webber et al., 2013; Welker & Wadzuk, 2012; Woods et al., 2018; Umbach et al., 2006; Yeung, 2015). In regard to the study, a large sample size and the use of logistic regression improved the generalizability of the study and mitigated threats to external validity.

Internal Validity

Additionally, there were threats to internal validity. For this research, threats to internal validity included the appropriateness of the selected data set to the sub RQs. I had to trust that the NSSE was ethical in their data collection process. I had to trust that they were honest and transparent and that the information on their website was accurate in their explanation of how they adhere to their own IRB standards and research standards. Therefore, I assumed that the data from the NSSE was valid and reliable. I also relied on research that tested the validity of the NSSE. I took into consideration that researchers have found the NSSE to be both a valid measure of student engagement (Miller et al., 2016; Pascarella et al., 2010; Pike, 2012) and a data set that still has weaknesses that should be considered when using the data (Campbell & Cabrera, 2011; Porter, 2011; Schneider; 2009; Culver et al., 2013). Porter (2011) questioned the validity of typical college student surveys and the ability of students to answer the questions truthfully and accurately. Schneider (2009) argued a lack of variance in measures in the NSSE questionnaire. Campbell and Cabrera (2011) argued that the NSSE is made up of strong theoretical grounding, but there had been little work to investigate the validity of the NSSE's five benchmarks and the extent that they predict student outcomes. Finally, Culver et al. (2013) also conducted a study to analyze if the NSSE's five-factor model benchmarks and found that the five-factor model did not fit the data sample. I returned to these concerns when I interpret the findings in Chapter 5.

Ethical Procedures

The first step to ensuring this research followed proper ethical procedures was to adhere to Walden University's IRB requirements when I began to conduct and gather research data. The data used for this research was archival data from the 2018 NSSE questionnaire.

As I previously stated, to ensure that data is anonymous, I worked with NSSE to ensure students cannot be identified. I did not know which institutions the participants attended. This process was necessary since I gathered data on the students' gender, type of sport played, and race. I also chose to omit other possible independent variables such as, school, major, or the student's year. With those variables it may have been possible to identify the student. I completed a formal request to the NSSE for the data. I stored the data on my computer. This data was only be used for this research project and then was deleted from my computer upon completion.

Finally, the United States Family Educational Rights and Privacy Act regulates the NSSE's use of student data. "The NSSE administration protocol also adheres to the federal regulations pertaining to the protection of human subjects and is approved by the Indiana University Internal Review Board" (Indiana University Bloomington, 2012).

Summary

In this chapter, I described the design and methodology of conducting a non experimental quantitative study, and the use of archival data from the NSSE. I also discussed the target population I have selected for this research. I defended the method's appropriateness for the sub RQs. I provided details on how the data will be collected from a validated questionnaire, background information on the NSSE and their survey, and how I plan on obtaining the data. I have discussed threats to internal and external validity and how I navigated them. Finally, I provided details on the ethical procedures I took while collecting data and conducting research.

In Chapter 4, I provide a description of the data collection process and the results of the SPSS statistical tests conducted on the NSSE data. The results from the logistic regression analysis are explained and summarized in tables. Finally, I conclude with a summary of how the analysis results answer the RQ and sub RQs.

Chapter 4: Results

Introduction

The purpose of this quantitative research was to determine to what extent academic and cocurricular engagement as represented by time spent on cocurricular activities and time spent preparing for class, race, type of sport played, and gender predict NCAA student-athletes' academic success. In this study, academic success was initially defined as a letter grade of C or higher. However, after a frequency test, the standard was raised to B or higher or there would have had no differentiation in the DV, as all but 23 students (1%) in the sample reported they had a letter grade of C or higher. I explain this change below. I sought to identify if student-athletes' engagement, gender, and/or race predict their academic success. In order to achieve this objective, the main RQ was, to what extent do academic and cocurricular engagement as represented by time spent on cocurricular activities and time spent preparing for class, race, type of sport played, and gender predict NCAA student-athletes' academic success?

In this chapter, I present the results on academic and cocurricular engagement as represented by time spent on cocurricular activities and time spent preparing for class, race, type of sport played, and gender's ability to predict NCAA student-athletes' academic success. In the first section of this chapter I review the purpose, research questions, and hypotheses. In the remainder of this chapter I describe data collection method, treatment, and results. The final section will include the results of the statistical analysis and include tables.

Data Collection

Data for this study was collected by NSSE between February and May 2018. The data is stored at the Center for Postsecondary Research at Indiana University School of Education. I was sent the data after receiving IRB approval from Walden University (08-19-19-0637953) and the research partner. The original number of participants from the 2018 survey was 275,219, with 46% comprised of first year students and 54% senior students. Participants were sampled across 491 institutions, 476 in the United States and 15 in Canada. The Center for Postsecondary Research at Indiana University School of Education provided me with a 20% sample of the total desired population. The sample I requested was comprised of NCAA student-athletes, first year, from American institutions. Data on specific NSSE survey questions were included in this research. Those survey questions included: time spent preparing for class, time spent on cocurricular activities, gender, type of sport played, race, and self-reported grades. I was given the 2018 NSSE data September of 2019.

Sample Selection

NSSE narrowed down the initial data set from 275,219 to 2,050 to develop a purposive sample of the target population for this study. In the data sharing agreement with NSSE, they agreed to provide me with a sample of 20% of the total population. This was a sample from the total number of student-athletes who took the NSSE in 2018. In 2018, 10,243 students indicated that they were a student-athlete on a team sponsored by their institution’s athletic department. The sample of 10,243 students was reduced when NSSE applied four parameters. First, they only included NCAA student-athletes.

Secondly, they only included first year student athletes. Thirdly, they only included student athletes from U.S. institutions. Finally, the data used was from the 2018 survey because that was the only year NSSE had collected data on type of sport played. NSSE did not included data on senior students, students from Canadian institutions, and all students who selected *no* when asked if they are a member of an athletic team sponsored by their institution. The data set used for this analysis consisted of 2,050 first-year, NCAA student-athletes from U.S. institutions. Once I received the data, I removed every student for whom there was missing data from the sample (*n* = 65). This left me with a population of 1,985.

Demographics

The descriptive characteristics of the participants, including the type of sport played and the number of student-athletes who responded to each variable are outlined in Table 3. The dataset used in this research is similar to the NCAA demographic characteristics in Table 1. Both the NCAA data and the NSSE data had a similar demographic make-up of student-athletes. In 2018 the NCAA's demographic make-up consisted of 12.6 % Black or African American student-athletes, whereas this data had 16%. The NCCA demographic make-up consisted of 65% White student-athletes, whereas this data had 76%. Finally, the NCAA's make up was 10% Hispanic or Latino, whereas this data was 6%. The demographic characteristics from this dataset are also different from the NCAA demographic characteristics in Table 1. The NCAA's demographic make-up was 2% Asian, whereas this data was 4.6%. The NCAA's make-up of American Indian or Alaskan Native was 0.4%, whereas this data sample was 1.7% (The Official Site of the NCAA, n.d.).

Finally, the 2018 NCAA's make-up consisted of 56% males and 46% females, whereas this data consisted of 40.3% males and 59.7% females (The Official Site of the NCAA, n.d.). This is a difference between the two data sets. The participants removed from his analysis due to missing answers consisted of 34 males and 27 females. This number indicates that males were slightly less likely to complete this survey than females. The difference in gender between the 2018 NSSE data and the total NCAA data could be due to the fact that the 2018 survey contained data from 6,175 first-year female student-athletes and only 4,099 first-year male student-athletes. This difference could be why the sample from NSSE contained more data from females than males, in comparison to the NCAA's total male to female ratio. It is important to note these similarities and differences because they demonstrate the possible applicability of this data and the results to other settings. The NSSE data, whereas different, is still similar to the NCAA total population to merit the analysis.

Table 3

Demographics of Data and Survey Question Responses

Survey question	Independent variable	NSSE data frequency (*n*)	NSSE data %	NCAA data %
Gender				
	Female/	1185	59.7	44
	Male	800	40.3	56
Race				
	White	1510	76.1	65
	Black or African American	250	12.6	16
	Hispanic or Latino	198	10	6
	Asian	92	4.6	2
	Other	42	2.1	3
	Preferred not to respond	40	2.0	
	American Indian or Alaskan	34	1.7	0.4
	Native Hawaiian or other Pacific Islander	20	1.0	
Type of sport played				
	Track & field	306	15.4	
	Soccer	225	11.3	
	Football	177	8.9	
	Cross country	170	8.6	
	Cheerleading or dance/pom squad	152	7.7	
	Other	150	7.6	
	Basketball	137	6.9	
	Softball	134	6.8	
	Volleyball/beach volleyball	122	6.1	
	Lacrosse	117	5.9	
	Swimming & diving	104	5.2	
	Tennis	89	4.5	

Baseball	85	4.3
Golf	75	3.8
Rowing	51	2.6
Field hockey	41	2.1
Wrestling	30	1.5
Ice hockey	27	1.4
Bowling	26	1.3

Note. I have omitted sports with a frequency less than 15.

Selection of Survey Questions

NSSE includes approximately 110 survey questions in the annual survey. For the purpose of this research, I included eight of the survey questions in the research. Of the eight questions, five are included to reflect the five sub RQs. The eight survey questions were selected because they fit the research question. I could have included more survey questions in this study, but they were not as good a fit to represent the variables in the study. The Appendix is a list of the survey questions and scaled responses I choose to include form the survey for the RQs. Based on the survey questions selected for this research, the independent variables and dependent variable could be analyzed through logistic regression. The main objective of this study, to determine to what extent academic and cocurricular engagement as represented by time spent on cocurricular activities and time spent preparing for class, race, type of sport played, and gender predict NCAA student-athletes' academic success, was guided by the data coding and assumptions. See Table 4 for frequencies of all other survey questions included in this analysis.

Table 4

Survey Question Frequencies (with a letter grade of C or higher as a measure of academic success)

Question	Answer	Frequency (n)	%
Academic Success			
	C or higher	1963	98.9
	C- or lower	22	1.1
Hours spent preparing for class in a typical 7-day week			
	0	7	.4
	1-5	229	11.5
	6-10	438	22.1
	11-15	449	22.6
	16-20	415	20.9
	21-25	245	12.3
	26-30	102	5.1
	More than 30	100	5.0
Hours spent on cocurricular activities in a typical 7-day week			
	0	129	6.5
	1-5	278	14.0
	6-10	375	18.9
	11-15	396	19.9
	16-20	393	19.8
	21-25	204	10.3
	26-30	92	4.6
	More than 30	118	5.9

Treatment and Intervention Fidelity

As stated in table 4, 98.9% of student included in this study experienced academic success as defined by a letter grade of C or higher. This standard of a C letter grade did not provide me with enough student-athletes' not achieving academic success to analyze the independent variables' predictability. Therefore, based on the initial observation that every student-athlete is academically successful, I raised the standard of academic success for this analysis to a B or higher. This standard is another significant benchmark used by the NCAA is the standard of academic honor roll. Student-athletes that obtain a GPA of 3.0 or higher, qualify for academic honor roll (Official Site of the NCAA, n.d.). A 3.0 GPA converts to an approximate letter grade of B (How to Calculate Your GPA, n.d.). Therefore, the standard for academic success was raised from C or higher to a B or higher for this analysis. See Table 5 for the updated means of student-athletes' academic success. In addition to removing all missing data, in accordance to Laerd Statistics (2015a), only independent variables with 15 cases or more were included in this analysis. Therefore, only cases with a minimum of 15 cases per independent variable were included in the logistic regression below. All other cases were removed. Fencing, gymnastics, riffle, skiing, and water polo were not analyzed.

Table 5

Survey Question Frequencies (with B or higher as an indication of academic success)

Question	Answer	Frequency (n)	%
Academic Success			
	B or higher	229	84.9
	B- or lower	1686	15.1

Results

I used logistic regression to understand the predictability of the independent variables (e.g., engagement, race, gender, type of sport played) on student-athletes' academic success. A regression analysis can be used to estimate the relationship among variables. For example, logistic regression analysis could be used to make predictions based on the variables. Logistic regression was a fit for this research because I wanted to predict the probability that an observation fell into one of the two categories of a dichotomous dependent variable based on one or more independent variables that were continuous or categorical (Laerd Statistics, 2015a).

Assumptions

When using binomial logistic regression to analyze data, it is critical to include the process of checking to make sure the data being analyzed can actually be analyzed using tests. Logistic regression has five assumptions that are important to consider. The first two assumptions of logistic regression relate to the study design. These assumptions were met when I chose the analysis method for the study.

The assumptions include: a dichotomous dependent variable, one or more independent variables, which were either continuous variables or nominal variables, there was independence of observations, the categories of the dichotomous dependent variable and all the nominal independent variables were mutually exclusive and exhaustive, and there was a bare minimum of 15 cases per independent variable (Laerd Statistics, 2015a).

For this study, assumptions associated with a logistic regression were tested prior to beginning the analysis. Logistic regression does not assume that the predictor and outcome variables have a linear relationship (Laerd Statistics, 2015b). Also, Laerd Statistics (2015b) indicated that logistic regression does not assume homoscedasticity or normality. Homoscedasticity means that the data values are spread out to the same extent for each group in the study. Normality means that data values have normal or bell curve distribution. For each sub RQ, the five assumptions of logistic regression were tested and were met. I discuss the assumptions and findings below.

Assumption 1: dichotomous dependent variable. First, there was a dichotomous dependent variable. The dependent variable was academic success, as measured by a self-reported grade of B or higher (Laerd Statistics, 2015a). This assumption was met.

Assumption 2: continuous variables or nominal variables. Secondly, there was one or more independent variables, which were either continuous variables or nominal variables. The independent variables were time spent preparing for class; time spent on cocurricular, race, type of sport played; and gender. In addition to these first two assumptions, the other three assumptions relate to the nature of the data and can be tested using SPSS software (Laerd Statistics, 2015a). This assumption was met.

Assumption 3: linearity. Linearity indicates the need for a linear relationship between the continuous predictor variables and the logit transformation of the dependent variable. A Box-Tidwell procedure can be used to test for a linear relationship between the predictive variable and the outcome variable. However, assumption of linearity only needs to be tested for continuous independent variable. I did not test the assumption of linearity because the variables in this study were categorical independent variables (both nominal and ordinal) (Laerd Statistics, 2015a). Therefore, this assumption was met.

Assumption 4: multicollinearity. Collinearity is the correlation between predictor variables. “Multicollinearity occurs when you have two or more independent variables that are highly correlated with each other. Multicollinearity could lead to problems with understanding which independent variable contributes to the variance explained in the dependent variable” (Laerd Statistics, 2015a). It could also lead to technical issues in calculating a binomial logistic regression model (Laerd Statistics, 2015a). Therefore, the predictor variables are tested through examining values for variance inflation factor (VIF), and tolerance. VIF is the reciprocal of tolerance and tolerance is the measure of collinearity (Laerd Statistics, 2015b). A VIF value greater than 5 suggests a high level of correlation, a value between 1 and 5 suggests a moderate correlation, and a value of 1 suggests no correlation. This assumption was tested for all sub RQs.

The test results were: RQ1, the VIF = 1.000, RQ2, the VIF = 1.000, RQ3, the VIF = 1.000, RQ4, the VIF = 1.007, 1.220, 1.978, 1.457, 1.003, 2.802, 1.110, and 1.129. RQ5, the VIF = 1.070, 1.107, 1.020, 1.180, 1.449, 1.018, 1.194, 1.052, 1.024, 1.121, 1.026, 1.278, 1.144, 1.099, 1.062, 1.752, 1.116, 1.012, and 1.242. Therefore, the variables of time spent preparing for class, time spent on cocurricular activities, and gender had little correlation. All the variables used in the analysis of race and type of sport played had a moderate correlation. These findings are reflected in the linear regression findings below.

Assumption 5: outliers. According to Laerd Statistics (2015a), there should be no significant outliers, high leverage points or high influential points. Outliners, as well as leverage points and influential cases, are all unusual points. When using SPSS to run binomial logistic regression on data, it is possible detect possible outliers, high leverage points, and highly influential points. The casewise diagnostics highlighted any cases where that case's standardized residual is greater than ±3 standard deviations. The common cut-off criteria used to define an outlier is a value of greater than ±3. Laerd Statistics (2015a) indicated that the researcher can choose to either include the outliers or remove them from the data analysis (Laerd Statistics, 2015a). The casewise diagnostics test for RQ1, RQ2, RQ3, RQ4, and RQ5 found that there were no residuals greater than ±3 standard deviations. Therefore, there were no outliers.

Statistical Analysis Findings

The logistic regression model (equation) for each of sub RQs predicted the probability of a student being successful using their self-reported grades. The results of this study's logistic regression results were used to analyze how the independent variables of time spent preparing for class, time spent on cocurriculars, gender, type of sport played, and race predicted academic success. Binomial logistic regression was used to analysis five sub RQs.

Hypotheses

The hypotheses for sub RQ1 are:

- $H_0 1$. The amount of time student-athletes spend preparing for class does not predict academic success in NCAA student-athletes.

- H_a1. The amount of time student-athletes spend preparing for class does predict academic success in NCAA student-athletes.

The hypotheses for sub RQ2 are:

- H_02. The amount of time student-athletes spend participating in cocurriculars does not predict academic success in NCAA student-athletes.
- H_a2. The amount of time student-athletes spend participating in cocurriculars does predict academic success in NCAA student-athletes.

The hypotheses for sub RQ3 are:

- H_03. The student-athletes' gender does not predict academic success des in NCAA student-athletes.
- H_a3. The student-athletes' gender does predict academic success in NCAA student-athletes.

The hypotheses for sub RQ4 are:

- H_04. The student-athletes' race does not predict academic success in NCAA student-athletes.
- H_a4. The student-athletes' race does predict academic success in NCAA student-athletes.

The hypotheses for sub RQ5 are:

- H_05. The student-athletes' type of sport played does not predict academic success in NCAA student-athletes.

- H_a5. The student-athletes' type of sport played does predict academic success in NCAA student-athletes.

Sub research question 1: time preparing for class. RQ1 was, to what extent does time spent preparing for class predict academic success in NCAA student-athletes? The research design supported examining if time spent preparing for class influenced NCAA student-athletes' academic success as measured by a letter grade of B or greater. Table 6 shows the observed count for time spent preparing for class as a predictor of academic success.

Table 6

Academic Success by Time Preparing for Class

Hours spent preparing for class in a typical 7-day week	Academic Success		Total
	Yes	No	
0	3	4	7
1-5	176	53	229
6-10	365	73	438
11-15	382	67	449
16-20	365	50	415
21-25	210	35	245
26-30	91	11	102
More than 30	94	6	100
Total	1,686	299	1,985

To answer the first research question and test the null hypothesis, a predictive model consisting of two variables was developed based on an SPSS analysis of the data. The following hypothetical predictive model (equation) of the logistic regression was developed using the results, shown in Table 7.

*Predicted logit (student success) = .920 + (.194) *time spent preparing for class*

The evaluation of the logistic regression model began with evaluating the results of the statistical tests for each of the predictor variables (See Table 7). According to the predictive model for student success, success was positively related to time spent preparing for class (β = .194, Exp(β) = 2.509, $p < .001$) and time spent preparing for class added statistically and significantly to the model, as measured by the standard of $p < 0.5$. The coefficient (β) for academic success indicate the change in the log odds (logit) for academic success that occurs for a one-unit change for each of the predictive variables (time spent preparing for class). The log odds change for time spent preparing for class .194, which indicates an increase of the log odds for each increase in time spent preparing for class. The odds ratios is another way to understand the results. The odds ratios for time spent preparing for class (Exp(β) = 2.509), indicates that the odds of student success is 2.509 times greater for every one-point increase in time spent preparing for class. Therefore, increasing time spent preparing for class results in an increase in the odds of a student being academically successful. However, based on goodness-of-fit and variance, the results were not significant, see below for more detail. Also, the standard of $p < 0.5$ may be explained by the large sample and not necessarily because the model was accurate.

Table 7

Variables in the Equation for Research Question 1

	B	SE β	Wald's χ^2	*df*	*Sig. (p)*	Exp(β) Odds Ratio	95 % C.I. for Exp(β) Lower	Upper
Constant	.920	.180	26.078	1	.000	1.214		
Time Spent Preparing for Class	.194	.042	21.282	1	.000	2.509	1.118	1.318

I used multiple measures to determine the statistical significance of the model and to test if the model for predicting student success fit the data provided by NSSE. The results of the omnibus tests of model coefficients, as shown in Table 10, indicated that the model was not statistically significant, χ^2 (2) = 4.892, p > .05. These results indicated that the model was not able to predict student success with the inclusion of the predictor variable of time spent preparing for class. The omnibus tests results were also used in determining whether the null hypothesis should be rejected.

Table 8

Omnibus Tests of Model Coefficients for Research Question 1

	Chi-square (χ^2)	Df	Sig. (p)
Step	4.892	4	.299

A second method of determining if the model was a good fit is to analyze how poorly the model predicted academic success. The Hosmer and Lemeshow goodness-of-fit test results, as shown in Table 9, indicated that the model was a good fit because the *p*-value was not significant (p = .299). For this test, the results indicate a goodness-of-fit when the results are not statistically significant. The results of the Hosmer and Lemeshow test are also used in determining whether the null hypothesis should be rejected.

Table 9

Hosmer and Lemeshow Test (HLχ^2) for Research Question 1

Step	Chi-square (χ^2)	Df	Sig. (p)
Step1	4.892	4	.299

Nagelkerke R^2 (see Table 10) can be used for measuring a model's effect size and the amount of variation in the dependent variable (academic success). The Nagelkerke R^2 = .020 indicated that about 2% of the variation in student success was explained by the model. *Nagelkerke* R^2 values range from zero to one where the value of one means that the model accounts for 100% of the variance in the outcome. Therefore, the model summary indicated that with the addition of the predictor variable (time spent preparing for class) to the model about 2% of the variation in academic success was explained. Even though the result of the effect size were small, it did indicate an improvement (i.e., a difference between a model with no variables and a model with one variable) in the model's ability to predict the likelihood of academic success.

Table 10

Model Summary for Research Question 1

	-2 Log Likelihood (-2LL)	Cox & Snell R^2	Nagelkerke R^2
Step1	1660.050	0.11	.020

A classification table was used to estimate the probability of academic success by assessing the effectiveness of the model's ability to correctly classify academic success or academic failure. In Table 11, the frequency of the logistic regression model predicted probabilities of success and no success (failure) compared to the actual frequency of success and no success (failure) are displayed. Step 0 relates to the situation where no independent variables have been added to the model and the model just includes the constant. Step 1 represent the results of the main logistic regression analysis with all independent variables added to the equation. Table 11 shows that without any independent variables, the 'best guess' is to assume that all participants did achieve academic success. If you assume this, you will overall correctly classify 84.9% of cases.

Step 0 also classified 100.0% of the students as being academically successful who were in fact successful. In step 1, after time spent preparing for class was added to the model, the model remained the same at 100.0%. The data from the classification table (see Table 11) was also used to calculate sensitivity and specificity. Sensitivity and specificity are measures also used in null hypothesis testing. Sensitivity is the ability of the model to correctly predict success for those students who were observed to be academically successful in the data. The model for basic arithmetic predicted academic success correctly 100.0% of the time. Specificity measures the ability of the model to correctly predict nonsuccessful students who were observed not being academically successful. The specificity of this model was 100.0%. Therefore, the model was only able to correctly predicted student failure 100.0% of the time.

Table 11 shows that all students were estimated as successful; from these, 1686 were indeed successful, and 84.9% failed. Therefore, the classification accuracy was 84.9. The practical value of this model could be to accurately predict failure, and to identify students at risk of failure before they actually fail. However, the model does not predict any failure at all.

Table 11

Classification Table for Research Question 1

			Predicted		
			Success		Percentage
				Yes	Correct
	Observed		No		
Step 0	Success	No	0	299	.0
		Yes	0	1686	100.0
Overall Percentage					84.9
Step 1	Success	No	0	299	.0
		Yes	0	1686	100.0
Overall Percentage					84.9

Note. The cut score is .500. At Step 0 no variables are in the model. At Step 1 both predictor variables are included in the model.

In summary, a binomial logistic regression was performed to determine the effects of time spent preparing for class on predicting the likelihood that NCAA student-athletes would be academically successful. The model was not statistically significant, χ^2 (2) = 4.892, $p > .05$. The model explained 2% (Nagelkerke R2) of the variance in academic success. As a predictor, time spent preparing for class was not statistically significant ($p <$ .299). The null hypothesis for RQ1 is “The amount of time student-athletes spend preparing for class does not predict academic success in NCAA student-athletes." The results indicated that the model was not significant (p = >.05) and had only 2% of variance. Therefore, I determined that the null hypothesis for RQ1 should be accepted and the alternative hypothesis should be rejected.

Sub research question 2: time on cocurriculars. RQ2 was, to what extent does time spent participating in cocurriculars predict academic success in NCAA student-athletes? The research design supported examining if time spent participating in cocurricular activities influenced NCAA student-athletes' academic success as measured by a letter grade of B or greater. Table 12 shows the observed count for time spent participating in cocurricular activities as a predictor of academic success.

Table 12

Academic Success by Time Spent on Cocurriculars

Hours spent participating in cocurriculars in a typical 7-day week	Academic Success	Yes	No	Total
0		97	32	129
1-5		219	59	278
6-10		309	66	375
11-15		349	47	396
16-20		348	45	393
21-25		183	21	204
26-30		82	10	92
More than 30		99	19	118
Total		1,686	299	1,985

To answer the second sub research question and test the null hypothesis, a predictive model consisting of two variables was developed based on an SPSS analysis of the data. The following hypothetical predictive model (equation) was developed using the results, shown in Table 13, of the logistic regression.

Predicted logit (student success) = 1.132 + *(.151) *time spent participating in cocurriculars*

The evaluation of the logistic regression model began with evaluating the results of the statistical tests for each of the predictor variables (See Table 13). According to the predictive model for student success, success was positively related to time spent participating in cocurricular activities (β = .151, Exp(β) = 1.164, $p < .001$) and time spent participating in cocurricular activities added statistically and significantly to the model, as measured by the standard of $p < 0.5$. The coefficient (β) for academic success indicate the change in the log odds (logit) for academic success that occurs for a one-unit change for each of the predictive variables (time spent participating in cocurricular activities). The log odds change for time spent participating in cocurricular activities .151, which indicates an increase of the log odds for each increase in time spent participating in cocurricular activities. The odds ratios is another way to understand the results. The odds ratios for time spent participating in cocurricular activities (Exp(β) = 1.164), indicates that the odds of student success is 1.164 times greater for every one-point increase in time spent participating in cocurricular activities. Therefore, increasing time spent participating in cocurricular activities results in an increase in the odds of a student being academically successful. However, based on goodness-of-fit and variance, the results were not significant, see below for more detail. Also, the standard of $p < 0.5$ may be explained by the large sample and not necessarily because the model was accurate.

Table 13

Variables in the Equation for Research Question 2

	B	SE β	Wald's χ^2	*df*	*Sig. (p)*	Exp(β) Odds Ratio	95 % C.I. for Exp(β) Lower	Upper
Constant	1.132	.151	56.591	1	.000	3.103		
Time Spent on cocurriculars	.151	.036	17.518	1	.000	1.164	1.084	1.249

I used multiple measures to determine the statistical significance of the model and to test if the model for predicting student success fit the data provided by NSSE. The results of the omnibus tests of model coefficients, as shown in Table 14, indicated that the model was not statistically significant, χ^2 (2) = 4.892, $p > .05$. These results indicated that the model was able to predict student success with the inclusion of the predictor variable of time spent participating in cocurricular activities. The omnibus tests results were also used in determining whether the null hypothesis should be rejected.

Table 14

Omnibus Tests of Model Coefficients for Research Question 2

	Chi-square (χ^2)	df	Sig. (p)
Step	4.892	4	.299

A second method of determining if the model was a good fit is to analyze how poorly the model predicted academic success. The Hosmer and Lemeshow goodness-of-fit test results, as shown in Table 15, indicated that the model was a good fit because the *p*- value was not significant ($p = .056$). For this test, the results indicate a goodness-of-fit when the results are not statistically significant. The results of the Hosmer and Lemeshow test are also used in determining whether the null hypothesis should be rejected.

Table 15

Hosmer and Lemeshow Test (HLχ^2) for Research Question 2

Step	Chi-square (χ^2)	df	Sig. (p)
Step1	10.786	5	.056

Nagelkerke R^2 (see Table 16) can be used for measuring a model's effect size and the amount of variation in the dependent variable (academic success). Nagelkerke $R^2 = .016$ indicated that about 1.6% of the variation in student success was explained by the model. Nagelkerke R^2 values range from zero to one where the value of one means that the model accounts for 100% of the variance in the outcome. Therefore, the model summary indicated that with the addition of the predictor variable (gender) to the model about 1.6% of the variation in academic success was explained. Even though the result of the effect size were small, it did indicate an improvement (i.e., a difference between a model with no variables and a model with one variable) in the model's ability to predict the likelihood of academic success.

Table 16

Model Summary for Research Question 2

	-2 Log Likelihood (-2LL)	Cox & Snell R^2	Nagelkerke R^2
Step1	1664.314	0.009	.016

A classification table was used to estimate the probability of academic success by assessing the effectiveness of the model's ability to correctly classify academic success or academic failure. In Table 17, the frequency of the logistic regression model predicted probabilities of success and no success (failure) compared to the actual frequency of success and no success (failure) are displayed. Step 0 relates to the situation where no independent variables have been added to the model and the model just includes the constant. Step 1 represent the results of the main logistic regression analysis with all independent variables added to the equation. Table 17 shows that without any independent variables, the 'best guess' is to assume that all participants did achieve academic success. If you assume this, you will overall correctly classify 84.9% of cases.

Step 0 also classified 100.0% of the students as being academically successful who were in fact successful. In step 1, after time spent preparing for class was added to the model, the model remained the same at 100.0%. The data from the classification table (see Table 17) was also used to calculate sensitivity and specificity. Sensitivity and specificity are measures also used in null hypothesis testing. Sensitivity is the ability of the model to correctly predict success for those students who were observed to be academically successful in the data. The model for basic arithmetic predicted academic success correctly 100.0% of the time. Specificity measures the ability of the model to correctly predict nonsuccessful students who were observed not being academically successful. The specificity of this model was 100.0%. Therefore, the model was only able to correctly predicted student failure 100.0% of the time.

Table 17 shows that all students were estimated as successful; from these, 1686 were indeed successful, and 84.9% failed. Therefore, the classification accuracy was 84.9. The practical value of this model could be to accurately predict failure, and to identify students at risk of failure before they actually fail. However, the model does not predict any failure at all.

Table 17

Classification Table for Research Question 2

			Predicted		
			Success		Percentage Correct
	Observed		No	Yes	
Step 0	Success	No	0	299	.0
		Yes	0	1686	100.0
Overall Percentage					84.9
Step 1	Success	No	0	299	.0
		Yes	0	1686	100.0
Overall Percentage					84.9

Note. The cut score is .500. At Step 0 no variables are in the model. At Step 1 both predictor variables are included in the model.

In summary, a binomial logistic regression was performed to determine the effects of time spent participating in cocurricular activities on predicting the likelihood that NCAA student-athletes would be academically successful. The model was not statistically significant, χ^2 (2) = 4.892, p > .05. The model explained 1.6% (Nagelkerke R2) of the variance in academic success. As a predictor, time spent participating in cocurricular activities was not statistically significant ($p < .299$). The null hypothesis for RQ2 is “The amount of time student-athletes spend participating in cocurricular activities does not predict academic success in NCAA student-athletes.” The results indicated that the model was not able to predict, with a significant difference, the likelihood of academic success with the use of time spent participating in cocurricular activities. Therefore, I determined that the null hypothesis for RQ2 should be accepted and the alternative hypothesis should be rejected. However, based on goodness-of-fit and variance, the results were not significant, see below for more detail. Also, the standard of $p < 0.5$ may be explained by the large sample and not necessarily because the model was accurate.

Sub research question 3: gender. RQ3 was, to what extent does student-athletes’ gender predict academic success in NCAA student-athletes? The research design supported examining if gender influenced NCAA student-athletes’ academic success as measured by a letter grade of B or greater. Table 18 shows the observed count for gender as a predictor of academic success.

Table 18

Academic Success by Gender

Gender	Academic Success			Total
		Yes	No	
Male		630	170	800
Female		1056	129	1185

To answer the third sub research question and test the null hypothesis, a predictive model consisting of two variables was developed based on an SPSS analysis of the data. The following hypothetical predictive model (equation) was developed using the results, shown in Table 19, of the logistic regression.

*Predicted logit (student success) = 2.102 + (-.793) *gender*

The evaluation of the logistic regression model began with evaluating the results of the statistical tests for each of the predictor variables (See Table 19). According to the predictive model for student success, success was positively related to gender (β = 2.102, Exp(β) = -.793, p < .001) and students' gender added statistically and significantly to the model, as measured by the standard of p < 0.1. The coefficient (β) for academic success indicate the change in the log odds (logit) for academic success that occurs for a one-unit change for each of the predictive variables (gender). The log odds change for students' gender -.793, which indicates a decrease of the log odds for each increase in gender. The odds ratios is another way to understand the results. The odds ratios for the students' gender (Exp(β) = .453), indicates that the odds of student success is .453 times greater for every one-point increase. Therefore, males are .453 times more likely to not experience academic success than females. Or, females are .453 times more likely to experience academic success than males.

Table 19

Variables in the Equation for Research Question 3

	B	SE β	Wald's χ^2	*df*	*Sig. (p)*	Exp(β) Odds Ratio	95 % C.I. for Exp(β) Lower	Upper
Constant	2.102	.093	508.135	1	.000	8.186	.353	.
Sex	-.793	.127	38.845	1	.000	.453	.353	.581

I used multiple measures to determine the statistical significance of the model and to test if the model for predicting student success fit the data provided by NSSE. The results of the omnibus tests of model coefficients, as shown in Table 20, indicated that the model was statistically significant, χ^2 (2) = 39.305, $p < .001$. These results indicated that the model was able to predict student success with the inclusion of the predictor variable of students' gender. The omnibus tests results were also used in determining whether the null hypothesis should be rejected.

Table 20

Omnibus Tests of Model Coefficients for Research Question 3

	Chi-square (χ^2)	df	Sig. (p)
Step	39.305	1	.000

A second method of determining if the model was a good fit is to analyze how poorly the model predicted academic success. The Hosmer and Lemeshow goodness-of-fit test results, as shown in Table 21, indicated that the model was a good fit because there was NS (no standard). For this test, the results indicate a goodness-of-fit when the results are not statistically significant. The results of the Hosmer and Lemeshow test are also used in determining whether the null hypothesis should be rejected.

Table 21

Hosmer and Lemeshow Test (HLχ^2) for Research Question 3

Step	Chi-square (χ^2)	df	Sig. (p)
Step1	.000	0	.

Nagelkerke R^2 (see Table 22) can be used for measuring a model's effect size and the amount of variation in the dependent variable (academic success). Nagelkerke R^2 = .034 indicated that about 3.4% of the variation in student success was explained by the model. Nagelkerke R^2 values range from zero to one where the value of one means that the model accounts for 100% of the variance in the outcome. Therefore, the model summary indicated that with the addition of the predictor variable (students' gender) to the model about 3.4% of the variation in academic success was explained. Even though the result of the effect size were small, it did indicate an improvement (i.e., a difference between a model with no variables and a model with one variable) in the model's ability to predict the likelihood of academic success.

Table 22

Model Summary for Research Question 3

	-2 Log Likelihood (-2LL)	Cox & Snell R^2	Nagelkerke R^2
Step1	1643.181	0.20	.034

A classification table was used to estimate the probability of academic success by assessing the effectiveness of the model's ability to correctly classify academic success or academic failure. In Table 23, the frequency of the logistic regression model predicted probabilities of success and no success (failure) compared to the actual frequency of success and no success (failure) are displayed. Step 0 relates to the situation where no independent variables have been added to the model and the model just includes the constant. Step 1 represent the results of the main logistic regression analysis with all independent variables added to the equation. Table 23 shows that without any independent variables, the 'best guess' is to assume that all participants did achieve academic success. If you assume this, you will overall correctly classify 84.9% of cases.

Step 0 also classified 100.0% of the students as being academically successful who were in fact successful. In step 1, after time spent preparing for class was added to the model, the model remained the same at 100.0%. The data from the classification table (see Table 23) was also used to calculate sensitivity and specificity. Sensitivity and specificity are measures also used in null hypothesis testing. Sensitivity is the ability of the model to correctly predict success for those students who were observed to be academically successful in the data. The model for basic arithmetic predicted academic success correctly 100.0% of the time. Specificity measures the ability of the model to correctly predict nonsuccessful students who were observed not being academically successful. The specificity of this model was 100.0%. Therefore, the model was only able to correctly predicted student failure 100.0% of the time.

Table 23 shows that all students were estimated as successful; from these, 1686 were indeed successful, and 84.9% failed. Therefore, the classification accuracy was 84.9. The practical value of this model could be to accurately predict failure, and to identify students at risk of failure before they actually fail. However, the model does not predict any failure at all.

Table 23

Classification Table for Research Question 3

			Predicted		
			Success		Percentage Correct
Observed			No	Yes	
Step 0	Success	No	0	299	.0
		Yes	0	1686	100.0
Overall Percentage					84.9
Step 1	Success	No	0	299	.0
		Yes	0	1686	100.0
Overall Percentage					84.9

Note. The cut score is .500. At Step 0 no variables are in the model. At Step 1 both predictor variables are included in the model.

In summary, a binomial logistic regression was performed to determine the effects of students' gender on predicting the likelihood that NCAA student-athletes would be academically successful. The model was statistically significant, χ^2 (2) = 39.305, $p < .01$. The model explained 3.4% (Nagelkerke R^2) of the variance in academic success. As a predictor, gender was statistically significant ($p < .000$). The null hypothesis for RQ3 is "The student-athletes' gender does not predict academic success des in NCAA student-athletes." The results indicated that the model was able to predict the likelihood of academic success with the use of students' gender. Therefore, I determined that the null hypothesis for RQ3 should be rejected and the alternative hypothesis should not be rejected. However, the standard of $p < 0.5$ may be explained by the large sample and not necessarily because the model was accurate. Also, the variance was relatively weak.

Sub research question 4: race. RQ4 was, to what extent does student-athletes' race predict academic success in NCAA student-athletes? The research design supported examining if race influenced NCAA student-athletes' academic success as measured by a letter grade of B or greater. Table 24 shows the observed count for race as a predictor of academic success.

Table 24

Academic Success by Race

Race	Academic Success	Yes	No	Total
White		1330	180	1510
Black or African American		167	83	250
Hispanic or Latino		158	40	198
Asian		88	4	92
Other		34	8	42
Prefer not to respond		31	9	40
American Indian or Alaskan Native		28	6	34
Native Hawaiian or Pacific Islander		16	4	20

To answer the fourth sub research question and test the null hypothesis, a predictive model consisting of two variables was developed based on an SPSS analysis of the data. The following hypothetical predictive model (equation) was developed using the results, shown in Table 25, of the logistic regression.

*Predicted logit (student success) = 1.567 + (1.474) *Asian*

*Predicted logit (student success) = 1.567 + (-.926) *Black or African American*

*Predicted logit (student success) = 1.567 + (.462) *White*

The evaluation of the logistic regression model began with evaluating the results of the statistical tests for each of the predictor variables (See Table 25). According to the predictive model for student success, race of Asian was positively related to student success (β = 1.474, Exp(β) = 4.366, p < .05) and students' race of Asian added statistically and significantly to the model, as measured by the standard of p < 0.5. As a predictor, the race of Asian was statistically significant (p = .006). According to the predictive model for student success, race of Black or African American was negatively related to student success (β = -.926, Exp(β) = .396, p < .001) and students' race of Black or African American added statistically and significantly to the model. As a predictor, the race of Black or African American was statistically significant (p = .000). Also, according to the predictive model for student success, race of White positively related to student success (β = .462, Exp(β) = 1.587, p < .05) and students' race of White added statistically and significantly to the model. As a predictor, the race of White was statistically significant (p = .048). All other race predictors were not statistically significant (p .801, p .346, p .551, p .779, and p .460).

The coefficient (β) for academic success indicate the change in the log odds (logit) for academic success that occurs for a one-unit change for each of the predictive variables (race). The log odds change for students' race of Asian is 1.474, which indicates a decrease of the log odds for each increase in race. The odds ratios is another way to understand the results. The odds ratios for the students' race (Exp(β) = 4.366) indicates that the odds of student success is 4.366 times greater. Therefore, Asian student-athletes are 4.366 times more likely to experience academic success.

The coefficient (β) for academic success indicate the change in the log odds (logit) for academic success that occurs for a one-unit change for each of the predictive variables (race). The log odds change for students' race of Black or African American is -.926, which indicates a decrease of the log odds for each increase in race. The odds ratios is another way to understand the results. The odds ratios for the students' race (Exp(β) = .396,), indicates that the odds of student success is .396 times greater. Therefore, Black or African American student-athletes are .396 times less likely to experience academic success.

The coefficient (β) for academic success indicate the change in the log odds (logit) for academic success that occurs for a one-unit change for each of the predictive variables (race). The log odds change for students' race of White is .462, which indicates a decrease of the log odds for each increase in race. The odds ratios is another way to understand the results. The odds ratios for the students' race (Exp(β) = 1.587) indicates that the odds of student success is 1.587 times greater. Therefore, White student-athletes are 1.587 times more likely to experience academic success.

Table 25

Variables in the Equation for Research Question 4

	B	SE β	Wald's χ^2	*df*	*Sig. (p)*	Exp(β) Odds Ratio	95 % C.I. for Exp(β) Lower	95 % C.I. for Exp(β) Upper
Constant	1.567	.239	43.026	1	.000	4.794		
American Indian or Alaskan Native	-.118	.466	.064	1	.801	.889	.357	2.217
Asian	1.474	.535	7.581	1	.000	4.366	1.529	12.463
Black or African American	-.224	.237	15.338	1	.000	.369	.249	.603
Hispanic or Latino	-.224	.237	.889	1	.346	.800	.502	1.273
Native Hawaiian or other Pacific Islander	-.305	.587	.356	1	.551	.704	.223	2.226
White	.462	.234	3.902	1	.048	1.587	1.004	2.510
Other	-.120	.429	0.79	1	.779	.887	.382	2.056
Prefer not to Respond	-.331	.448	.545	1	.460	.719	.299	1.728

I used multiple measures to determine the statistical significance of the model and to test if the model for predicting student success fit the data provided by NSSE. The results of the omnibus tests of model coefficients, as shown in Table 26, indicated that the model was statistically significant, χ^2 (2) = 83.715, $p < .05$. These results indicated that the model was able to predict student success with the inclusion of the predictor variable of students' race. The omnibus tests results were also used in determining whether the null hypothesis should be rejected.

Table 26

Omnibus Tests of Model Coefficients for Research Question 4

	Chi-square (χ^2)	df	Sig. (p)
Step	83.715	8	.000

A second method of determining if the model was a good fit is to analyze how poorly the model predicted academic success. The Hosmer and Lemeshow goodness-of-fit test results, as shown in Table 27, indicated that the model was a good fit because the p value was not significant (p = .542). For this test, the results indicate a goodness-of-fit when the results are not statistically significant. The results of the Hosmer and Lemeshow test are also used in determining whether the null hypothesis should be rejected.

Table 27

Hosmer and Lemeshow Test (HLχ^2) for Research Question 4

Step	Chi-square (χ^2)	df	Sig. (p)
Step1	1.225	2	.542

Nagelkerke R^2 (see Table 28) can be used for measuring a model's effect size and the amount of variation in the dependent variable (academic success). The Nagelkerke R^2 = .072 indicated that about 7.2% of the variation in student success was explained by the model. Nagelkerke R^2 values range from zero to one where the value of one means that the model accounts for 100% of the variance in the outcome. Therefore, the model summary indicated that with the addition of the predictor variable (students' race) to the model about 7.2% of the variation in academic success was explained. Even though the result of the effect size were small, it did indicate an improvement (i.e., a difference between a model with no variables and a model with one variable) in the model's ability to predict the likelihood of academic success.

Table 28

Model Summary for Research Question 4

	-2 Log Likelihood (-2LL)	Cox & Snell R^2	Nagelkerke R^2
Step1	1598.771	.041	.072

A classification table was used to estimate the probability of academic success by assessing the effectiveness of the model's ability to correctly classify academic success or academic failure. In Table 29, the frequency of the logistic regression model predicted probabilities of success and no success (failure) compared to the actual frequency of success and no success (failure) are displayed. Step 0 relates to the situation where no independent variables have been added to the model and the model just includes the constant. Step 1 represent the results of the main logistic regression analysis with all independent variables added to the equation. Table 29 shows that without any independent variables, the 'best guess' is to assume that all participants did achieve academic success. If you assume this, you will overall correctly classify 84.9% of cases.

Step 0 also classified 100.0% of the students as being academically successful who were in fact successful. In step 1, after time spent preparing for class was added to the model, the model remained the same at 100.0%. The data from the classification table (see Table 29) was also used to calculate sensitivity and specificity. Sensitivity and specificity are measures also used in null hypothesis testing. Sensitivity is the ability of the model to correctly predict success for those students who were observed to be academically successful in the data. The model for basic arithmetic predicted academic success correctly 100.0% of the time. Specificity measures the ability of the model to correctly predict nonsuccessful students who were observed not being academically successful. The specificity of this model was 100.0%. Therefore, the model was only able to correctly predicted student failure 100.0% of the time.

Table 29 shows that all students were estimated as successful; from these, 1686 were indeed successful, and 84.9% failed. Therefore, the classification accuracy was 84.9. The practical value of this model could be to accurately predict failure, and to identify students at risk of failure before they actually fail. However, the model does not predict any failure at all.

Table 29

Classification Table for Research Question 4

			Predicted		
			Success		Percentage Correct
	Observed		No	Yes	
Step 0	Success	No	0	299	.0
		Yes	0	1686	100.0
Overall Percentage					84.9
Step 1	Success	No	0	299	.0
		Yes	0	1686	100.0
Overall Percentage					84.9

Note. The cut score is .500. At Step 0 no variables are in the model. At Step 1 both predictor variables are included in the model.

In summary, a binomial logistic regression was performed to determine the effects of students' race on predicting the likelihood that NCAA student-athletes would be academically successful. The model was statistically significant, χ^2 (2) = 83.715, $p < .05$. The model explained 7.2% (Nagelkerke R2) of the variance in academic success. As a predictor, the race of Asian was statistically significant ($p < .05$). As a predictor, the race of Black or African American was statistically significant ($p < .000$). As a predictor, the race of White was also statistically significant ($p < .05$). All other race predictors were not statistically significant (*p* .801, *p* .346, *p* .551, *p* .779, and *p* .460). The null hypothesis for RQ4 is "The student-athletes' race does not predict academic success des in NCAA student-athletes." The results indicated that the model was able to predict, with a significant difference, the likelihood of academic success with the use of students' race for Asian, Black or African American, and White student-athletes. Therefore, I determined that the null hypothesis for RQ4 should be rejected and the alternative hypothesis should not be rejected. However, for the other listed races, the results indicated that the model was not able to predict, with a significant difference, the likelihood of academic success with the use of students' race for all other races. Therefore, I determined that the null hypothesis for RQ4 should not be rejected and the alternative hypothesis should be rejected. However, the standard of $p < 0.5$ may be explained by the large sample and not necessarily because the model was accurate. Also, the variance was relatively weak.

Sub research question 5: sport. RQ5 was, to what extent does student-athletes' type of sport played predict academic success in NCAA student-athletes? The research design supported examining if type of sport played influenced NCAA student-athletes' academic success as measured by a letter grade of B or greater. Table 30 shows the observed count for race as a predictor of academic success.

Table 30

Academic Success by Type of Sport

Race	Academic Success	Yes	No	Total
Track & Field		263	43	306
Soccer		189	36	225
Football		118	59	177
Cross Country		150	20	170
Cheerleading or Dance/Pom Squad		129	23	152
Other		112	10	122
Basketball		113	24	137
Softball		118	16	134
Volleyball/Beach Volleyball		112	10	122
Lacrosse		98	19	117
Swimming & Diving		88	16	104
Tennis		85	4	89
Baseball		71	14	85
Golf		69	6	75
Rowing		47	4	51
Field Hockey		35	6	41
Wrestling		18	12	30
Ice Hockey		23	4	27
Bowling		23	3	26

To answer the fifth sub research question and test the null hypothesis, a predictive model consisting of two variables was developed based on an SPSS analysis of the data. The following hypothetical predictive model (equation) was developed using the results, shown in Table 31, of the logistic regression.

*Predicted logit (student success) = 2.040 + (.266) *Football*

*Predicted logit (student success) = 2.040 + (1.254) *Tennis*

*Predicted logit (student success) = 2.040 + (.198) *Wrestling*

The evaluation of the logistic regression model began with evaluating the results of the statistical tests for each of the predictor variables (See Table 31). According to the predictive model for student success, football, tennis, and wrestling are positively related to student success. Football (β = -1.324, Exp(β) = .226, p < .001), Tennis (β = 1.254, Exp(β) = 3.504, p < .05), and wrestling (β = -1.617, Exp(β) = .198, p < .001) added statistically and significantly to the model, as measured by the standard of p < 0.5. As a predictor, the type of sport football and wrestling were statistically significant (p < .000). As a predictor, the type of sport tennis was also statistically significant (p < .026). All other type of sport played predictors were not statistically significant.

The coefficient (β) for academic success indicate the change in the log odds (logit) for academic success that occurs for a one-unit change for each of the predictive variables (type of sport played). The log odds change for students' type of sport played of football is -1.324, which indicates a decrease of the log odds for each increase in type of sport played. The odds ratios is another way to understand the results. The odds ratios for the type of sport played of football (Exp(β) = .266), indicates that the odds of student success is .266 times greater for every one-point increase in students' type of sport played of football. Therefore, football players are .266 times less likely to be academically successful.

The coefficient (β) for academic success indicate the change in the log odds (logit) for academic success that occurs for a one-unit change for each of the predictive variables (type of sport played). The log odds change for students' type of sport played of tennis is 1.254, which indicates a decrease of the log odds for each increase in type of sport played. The odds ratios is another way to understand the results. The odds ratios for the type of sport played of tennis (Exp(β) = 3.504,), indicates that the odds of student success is 3.504 times greater for every one-point increase in students' type of sport played of tennis. Therefore, tennis players are 3.504 times more likely to be academically successful.

The coefficient (β) for academic success indicate the change in the log odds (logit) for academic success that occurs for a one-unit change for each of the predictive variables (type of sport played). The log odds change for students' type of sport played of wrestling is -1.617, which indicates a decrease of the log odds for each increase in type of sport played. The odds ratios is another way to understand the results. The odds ratios for the type of sport played of wrestling (Exp(β) = .198,), indicates that the odds of student success is .198 times greater for every one-point increase in students' type of sport played of wrestling. Therefore, wrestlers are .198 times less likely to be academically successful.

Table 31

Variables in the Equation for Research Question 5

	B	SE β	Wald's χ^2	*df*	*Sig. (p)*	Exp(β) Odds Ratio	95 % C.I. for Exp(β) Lower	95 % C.I. for Exp(β) Upper
Constant	2.040	.132	239.866	1	.000	7.693		
Baseball	-2.98	.313	.910	1	.340	.742	.402	1.370
Basketball	-.432	.249	3.011	1	.083	.649	.399	1.057
Bowling	.270	.692	.152	1	.697	1.310	.337	5.085
Cheerleading or Dance/ Pom Squad	-.300	.254	1.393	1	.238	.741	.450	1.219
Cross Country	.237	.297	.653	1	.426	1.267	.708	2.268
Field Hockey	-.096	.469	.042	1	.837	.908	.362	2.279
Football	-1.324	.197	45.130	1	.000	.266	.181	.391
Golf	.564	.458	1.518	1	.218	1.757	.717	4.309
Ice Hockey	-.018	.598	.001	1	.976	.982	.304	3.171
Lacrosse	-.352	.274	1.651	1	.199	.703	.411	1.203
Rowing	.666	.573	1.354	1	.245	1.947	.634	5.983
Soccer	-.354	.216	2.679	1	.102	.702	.460	1.072
Softball	.013	.289	.002	1	.965	1.013	.575	1.783
Swimming & Diving	-.292	.293	.993	1	.319	.747	.420	1.326
Tennis	1.254	.561	4.988	1	.026	3.504	1.166	10.532
Track & Field	-.264	.230	1.312	1	.252	.768	.489	1.206
Volleyball/ Beach Volleyball	.466	.350	1.771	1	.183	1.593	.802	3.163
Wrestling	-1.617	.387	17.494	1	.000	.198	.093	.423
Other	2.040	.259	1.477	1	.224	.730	.439	1.213

I used multiple measures to determine the statistical significance of the model and to test if the model for predicting student success fit the data provided by NSSE. The results of the omnibus tests of model coefficients, as shown in Table 32, indicated that the model was statistically significant, χ^2 (2) = 78.785, $p < .05$. These results indicated that the model was able to predict student success with the inclusion of the predictor variable of type of sport played. The omnibus tests results were also used in determining whether the null hypothesis should be rejected.

Table 32

Omnibus Tests of Model Coefficients for Research Question 5

	Chi-square (χ^2)	df	Sig. (p)
Step	78.785	19	.000

A second method of determining if the model was a good fit is to analyze how poorly the model predicted academic success. The Hosmer and Lemeshow goodness-of-fit test results, as shown in Table 33, indicated that the model was a good fit because the p value was not significant (p = 1.000). For this test, the results indicate a goodness-of-fit when the results are not statistically significant. The results of the Hosmer and Lemeshow test are also used in determining whether the null hypothesis should be rejected.

Table 33

Hosmer and Lemeshow Test (HLχ^2) for Research Question 5

Step	Chi-square (χ^2)	df	Sig. (p)
Step1	.622	8	1.000

Nagelkerke R^2 (see Table 34) can be used for measuring a model's effect size and the amount of variation in the dependent variable (academic success). Nagelkerke R^2 = .068 indicated that about 6.8% of the variation in student success was explained by the model. Nagelkerke R^2 values range from zero to one where the value of one means that the model accounts for 100% of the variance in the outcome. Therefore, the model summary indicated that with the addition of the predictor variable (type of sport played) to the model about 6.8% of the variation in academic success was explained. Even though the result of the effect size were small, it did indicate an improvement (i.e., a difference between a model with no variables and a model with one variable) in the model's ability to predict the likelihood of academic success.

Table 34

Model Summary for Research Question 5

	-2 Log Likelihood (-2LL)	Cox & Snell R^2	Nagelkerke R^2
Step1	1603.701	.039	.068

A classification table was used to estimate the probability of academic success by assessing the effectiveness of the model's ability to correctly classify academic success or academic failure. In Table 35, the frequency of the logistic regression model predicted probabilities of success and no success (failure) compared to the actual frequency of success and no success (failure) are displayed. Step 0 relates to the situation where no independent variables have been added to the model and the model just includes the constant. Step 1 represent the results of the main logistic regression analysis with all independent variables added to the equation. Table 35 shows that without any independent variables, the 'best guess' is to assume that all participants did achieve academic success. If you assume this, you will overall correctly classify 84.9% of cases.

Step 0 also classified 100.0% of the students as being academically successful who were in fact successful. In step 1, after time spent preparing for class was added to the model, the model remained the same at 100.0%. The data from the classification table (see Table 35) was also used to calculate sensitivity and specificity. Sensitivity and specificity are measures also used in null hypothesis testing. Sensitivity is the ability of the model to correctly predict success for those students who were observed to be academically successful in the data. The model for basic arithmetic predicted academic success correctly 100.0% of the time. Specificity measures the ability of the model to correctly predict nonsuccessful students who were observed not being academically successful. The specificity of this model was 100.0%. Therefore, the model was only able to correctly predicted student failure 100.0% of the time.

Table 35 shows that all students were estimated as successful; from these, 1686 were indeed successful, and 84.9% failed. Therefore, the classification accuracy was 84.9. The practical value of this model could be to accurately predict failure, and to identify students at risk of failure before they actually fail. However, the model does not predict any failure at all.

Table 35

Classification Table for Research Question 5

			Predicted		
			Success		Percentage Correct
Observed			No	Yes	
Step 0	Success	No	0	299	.0
		Yes	0	1686	100.0
Overall Percentage					84.9
Step 1	Success	No	0	299	.0
		Yes	0	1686	100.0
Overall Percentage					84.9

Note. The cut score is .500. At Step 0 no variables are in the model. At Step 1 both predictor variables are included in the model.

In summary, a binomial logistic regression was performed to determine the effects of type of sport played on predicting the likelihood that NCAA student-athletes would be academically successful. The model was statistically significant, χ^2 (2) = 78.785, $p < .05$. The model explained 6.8% (Nagelkerke R2) of the variance in academic success. As a predictor, the type of sport played of football tennis, and wrestling were statistically significant ($p < .05$). All other type of sport played predictors were not statistically significant. The null hypothesis for RQ5 is “The student-athletes’ type of sport played does not predict academic success des in NCAA student-athletes.” The results indicated that the model was able to predict, with a significant difference, the likelihood of academic success with the use of students’ type of sport played for football, tennis, and wrestling. Therefore, I determined that the null hypothesis for RQ5 should be rejected and the alternative hypothesis should not be rejected. However, for the other type of sports played, the results indicated that the model was not able to predict, with a significant difference, the likelihood of academic success with the use of students' type of sport played. Therefore, I determined that the null hypothesis for RQ5 should not be rejected and the alternative hypothesis should be rejected. However, the standard of $p < 0.5$ may be explained by the large sample and not necessarily because the model was accurate. Also, the variance was relatively weak.

Additional Statistical Tests

The sub research questions for this study analyzed if engagement factors such as time spent preparing for class or time spent participating in cocurricular activities and demographic factors such as gender, race, and type of sport played predicted the likelihood of student-athletes' academic success. No additional tests of the hypotheses emerged. However, I examined whether a model that used all predictor variables (time spent preparing for class or time spent participating in cocurricular activities and demographic factors such as gender, race, and type of sport played) would improve predicting the student-athletes' academic success when compared to the first model analyzed. The results from this analysis were similar to the findings of the original study for the 5 sub research questions.

The second model results were statistically significant, χ^2 (2) = 167.400, $p < .000$. The addition of all predictor variables did not improve this model's ability to predict the likelihood of student-athletes' academic success. In the original model's ability to predict the likelihood of student-athletes' academic success was 84.9%. The second model's ability was also 84.9%. The results of the classification table are shown in Table 36.

Table 36

Classification Table for Modified Research Question

	Observed		Predicted: Success No	Predicted: Success Yes	Percentage Correct
Step 0	Success	No	0	299	.0
		Yes	0	1686	100.0
Overall Percentage					84.9
Step 1	Success	No	0	299	.0
		Yes	0	1686	100.0
Overall Percentage					84.9

Note. The cut score is .500. At Step 0 no variables are in the model. At Step 1 both predictor variables are included in the model.

The results of this second model for student success also indicated that the results for time spent preparing for class, time spent on cocurricular activities, gender, football, wrestling, tennis, African American, and Asian were statistically significant ($p < .05$). Whereas time spent preparing for class and time spent on cocurricular activities were significant ($p = .010$) for class and ($p = .003$) for cocurriculars, the Hosmer and Lemeshow goodness-of-fit test results found those variables were not a good fit and therefore not significant. Also, the student-athlete race of White was significant in the first model ($p < .048$) but was not statistically significant in this second model ($p > .05$)

(see Table 37). The rest of the results for significance in the second model were very similar to the results from the first model. For the original model, sex was (*p* = .000) but for the second model it was (*p* = .002). For the original model, Black or African American was (*p* = .000) but for the second model it was (*p* = .007). For the original model, Asian was (*p* = .000) but for the second model it was (*p* = .008). For the original model, football was (*p* = .000) but for the second model it was (*p* = .002). For the original model, wrestling was (*p* = .000) but for the second model it was (*p* = .001). Lastly, for the original model, tennis was (*p* = .026) but for the second model it was (*p* = .023).

Table 37

Variables in the Equation for Modified Research Question

	B	SE β	Wald's χ^2	*df*	*Sig.* *(p)*	Exp(β) Odds Ratio
Time spent preparing for class	.116	.045	6.624	1	.010	1.123
Time spent on cocurricular activities	.117	.039	9.012	1	.003	1.124
Sex	-.498	.165	9.160	1	.002	2.696
Black or African American	-.688	.255	7.259	1	.007	.503
Asian	1.454	.551	6.975	1	.008	4.281
White	.397	.246	2.613	1	.106	1.487
Football	-.672	.221	9.253	1	.002	.511
Wrestling	-1.345	.412	10.809	1	.001	.258
Tennis	1.208	.564	5.159	1	.023	3.589

When examining student success for both models, the results indicated that female student-athletes were .453 times more likely to report that they experience academic success than males, because the odds ratio (*OR)* = .453 in the original model and *OR* = 2.696 in the second model. Black or African American student-athletes were .396 times more less likely to report that they experience academic success, because the odds ratio (*OR)* = .396 in the original model and *OR* = .503 in the second model. Asian student-athletes were 4.366 times more likely to report that they experience academic success, because the odds ratio (*OR)* = 4.366 in the original model and *OR* = 4.281 in the second model. White student-athletes were 1.587 times more likely to report that they experience academic success, because the odds ratio (*OR)* = 1.587 in the original model and *OR* = 1.487 in the second model. Football players were .266 times less likely to report that they experience academic success, because the odds ratio (*OR)* = .266 in the original model and *OR* = .511 in the second model. Wrestlers were .198 less more likely to report that they experience academic success, because the odds ratio (*OR)* = .198 in the original model and *OR* = .258 in the second model. Tennis players were 3.504 times more likely to report that they experience academic success, because the odds ratio (*OR)* = 3.504 in the original model and *OR* = 3.589 in the second model. Therefore, the results were similar in both models, except for sex. The results on female student-athletes went from .453 times more to 2.696 more likely to report that they experience academic success than males.

There was also a difference in variance between the original model and the new model. Sub RQ 1 had a variance of 2% in the original model, sub RQ2 was 1.6%, sub RQ

3 was 3.4%, sub RQ 4 was 7.2%, and sub RQ 5 was 6.8%. While these were small numbers, they still fit the data. For the second model, the variance was 14.1 % this is a stronger number. Therefore, in the second model, there was stronger variance accounted for in the significant results.

Summary

In this chapter, there was a discussion on the data used for this research, including the data collection method. There was also a discussion on the treatment and intervention fidelity used. The results of the logistic regression analysis and the assumptions that were considered while analyzing the data were described, including additional tests used on the data based on the assumptions. Finally, there was a discussion on the statistical analysis findings for each sub RQ, including tables to illustrate results.

In summary, for RQ1, a binomial logistic regression was performed to determine the effects of time spent preparing for class on predicting the likelihood that NCAA student-athletes would be academically successful. The model was not statistically significant. The results indicated that the model was not able to predict, with a significant difference, the likelihood of academic success with the use of time spent preparing for class. Also, the variance was relatively weak. Therefore, I determined that the null hypothesis for RQ1 should be accepted and the alternative hypothesis should be rejected.

For RQ2, a binomial logistic regression was performed to determine the effects of time spent participating in cocurricular activities on predicting the likelihood that NCAA student-athletes would be academically successful. The model was not statistically significant. The results indicated that the model was not able to predict, with a significant difference, the likelihood of academic success with the use of time spent participating in cocurricular activities. Also, the variance was relatively weak. Therefore, I determined that the null hypothesis for RQ2 should be accepted and the alternative hypothesis should be rejected.

For RQ3, a binomial logistic regression was performed to determine the effects of students' gender on predicting the likelihood that NCAA student-athletes would be academically successful. The model was statistically significant. The results indicated that the model was able to predict, with a significant difference, the likelihood of academic success with the use of students' gender. Therefore, I determined that the null hypothesis for RQ3 should be rejected and the alternative hypothesis should not be rejected. Females were .453 times more likely to experience academic success than males. However, the standard of $p < 0.5$ may be explained by the large sample and not necessarily because the model was accurate. Also, the variance was relatively weak.

For RQ4, a binomial logistic regression was performed to determine the effects of students' race on predicting the likelihood that NCAA student-athletes would be academically successful. The model was statistically significant. As a predictor, the race of Asian, the race of Black or African American, and the race of White were statistically significant. All other race predictors were not statistically significant. The results indicated that the model was able to predict, with a significant difference, the likelihood of academic success with the use of students' race for Asian, Black or African American, and White student-athletes. Therefore, I determined that the null hypothesis for RQ4 should be rejected and the alternative hypothesis should not be rejected. However, for the other listed races, the results indicated that the model was not able to predict, with a significant difference, the likelihood of academic success with the use of students' race for all other races. Therefore, I determined that the null hypothesis for RQ4 should not be rejected and the alternative hypothesis should be rejected. Asian students were 4.366 times more likely to experience academic success, Black or African American students were .396 times less likely to experience academic success, and White students were 1.587 times more likely to experience academic success. However, the standard of $p < 0.5$ may be explained by the large sample and not necessarily because the model was accurate. Also, the variance was relatively weak.

For RQ5, a binomial logistic regression was performed to determine the effects of type of sport played on predicting the likelihood that NCAA student-athletes would be academically successful. The model was statistically significant. As a predictor, the type of sport played of football, wrestling, and tennis were statistically significant. All other type of sport played predictors were not statistically significant. The results indicated that the model was able to predict, with a significant difference, the likelihood of academic success with the use of students' type of sport played for football, tennis, and wrestling. Therefore, I determined that the null hypothesis for RQ5 should be rejected and the alternative hypothesis should not be rejected. However, for the other type of sports played, the results indicated that the model was not able to predict, with a significant difference, the likelihood of academic success with the use of students' type of sport played. Therefore, I determined that the null hypothesis for RQ5 should not be rejected and the alternative hypothesis should be rejected. Tennis players were 3.504 times more likely to be academically successful, football players were .266 times less likely to be academically successful, and wrestlers were .198 times less likely to be academically successful. However, the standard of $p < 0.5$ may be explained by the large sample and not necessarily because the model was accurate. Also, the variance was relatively weak.

The second model results were statistically significant. The addition of all predictor variables did not improve this model's ability to predict the likelihood of student-athletes' academic success as both were 84.9%. The results of this second model for student success also indicated that the results for time spent preparing for class, time spent on cocurricular activities, gender, football, wrestling, tennis, African American, and Asian were statistically significant. Also, the student-athlete race of White was significant in the first model but was not statistically significant in this second. Finally, the odds ratio for the variables in the original model were similar to the odds ratio for the variables in the second model. There was also stronger variance in the second model.

In Chapter 5 I discuss the implications of the logistic regression results for each of the sub RQs. I also discuss the limitations of the research and how these findings may fill a gap in the literature. Finally, I identify and discuss the main research question of this study and provide possible future research questions for other researchers to consider.

Chapter 5: Discussion, Conclusions, and Recommendations

For this study, I analyzed how time spent preparing for class, time spent participating in cocurriculars, race, type of sport played, and gender may influence academic success. Researchers have already investigated the positive influences that athletic participation has on academic performance in areas such as graduation rates, grades, and test scores and behavioral areas such as leadership and relationships (Aljarallah & Bakoban, 2015; Bowen & Greene, 2012; Bradley et al., 2012; Castelli et al., 2014; Insler & Karam, 2017; Schultz, 2016; Yeung, 2015). Researchers have also focused on NCAA student-athletes and race, division, gender, in-season versus out of season athletic participation, and major (Beron & Piquero, 2016; Bimper, 2014; Robst & Keil, 2000; Schultz, 2016). However, much of that research was inconclusive or showed little relationship between the listed variables, with the researchers stating a need for more research to confirm or test their findings.

In light of the increasing pressures college student-athletes are under, it is surprising that no recent studies were identified that replicate, affirm, or challenge findings from these research studies. Also, the NCAA is frequently changing its policies and those changes may affect their student-athletes' academic success. For example, the NCAA has recently changed their requirements for time-off from athletics for students. The other issue within the NCAA is making sure star student-athletes remain academically eligible. I was unable to find recent studies that demonstrate how demographic variables or engagement variables are related to student athletes' academic success. Most of the studies focus on comparing nonathlete students with student-athletes.

My purpose in this quantitative research was to the extent to which academic and cocurricular engagement as represented by time spent on cocurricular activities and time spent preparing for class, as well as race, type of sport played, and gender predict NCAA student-athletes' academic success. The data provided insight into some differences regarding NCAA student-athletes' academic success, race, type of sport played, gender, and how student-athletes allocate their time amongst time spent preparing for class and participating in cocurricular engagements.

Summary of Findings

Females (n = 1,185) who responded to the NSEE survey in 2018 were .453 times more likely to report that they experience academic success than males. The logistic regression analysis of gender by academic success was statistically, χ^2 (2) = 39.305, p < .001. As a predictor, gender was statistically significant (p < .000). The research supports that Asian student-athletes were 4.366 times more likely to experience academic success, Black or African American student-athletes were .396 times less likely to experience academic success, and White student-athletes were 1.587 times more likely to experience academic success. The logistic regression analysis of race by academic success was statistically significant, χ^2 (2) = 83.715, p < .05. As a predictor, the race of Asian was statistically significant (p < .05). As a predictor, the race of Black or African American was statistically significant (p < .000). As a predictor, the race of White was also statistically significant (p < .05). The research supports that tennis players were 3.504

times more likely to be academically successful, football players were .266 times less likely to be academically successful, and wrestlers were .198 times less likely to be academically successful. The logistic regression analysis of type of sport played by academic success was statistically significant, χ^2 (2) = 78.785, $p < .05$. As a predictor, the type of sport played of football ($p < .000$), wrestling ($p < .000$), and tennis ($p < .05$) were statistically significant. The findings in this research were not exceedingly strong and did not indicate a much greater likelihood of academic success or academic struggle. Also, the variance for each sub RQ was below 10%. Sub RQ 1 had a variance of 2%, sub RQ2 was 1.6%, sub RQ 3 was 3.4%, sub RQ 4 was 7.2%, and sub RQ 5 was 6.8%. While these were small numbers, they still fit the data. However, the standard of $p < 0.5$ may be explained by the large sample and not necessarily because the model was accurate. Also, the variance was relatively weak.

There were also nonsignificant findings in this study. A logistic regression analysis of time spent preparing for class by academic success was not statistically significant, χ^2 (2) = 4.892, $p > .05$. As a predictor, time spent preparing for class was not statistically significant ($p < .299$). The results indicated that the model was not able to predict, with a significant difference, the likelihood of academic success with the use of time spent preparing for class. Also, a logistic regression analysis of time spent participating in cocurricular activities by academic success was not statistically significant, χ^2 (2) = 4.892, $p > .05$. As a predictor, time spent participating in cocurricular activities was not statistically significant ($p < .299$). The results indicated that the model was not able to predict, with a significant difference, the likelihood of academic success with the use of time spent participating in cocurricular activities. Ultimately, based on goodness-of-fit and variance, the results were not significant. Also, the standard of $p <$ 0.5 may be explained by the large sample and not necessarily because the model was accurate.

I also examined whether a model that used all predictor variables (time spent preparing for class or time spent participating in cocurricular activities and demographic factors such as gender, race, and type of sport played) would improve predicting the student-athletes' academic success when compared to the first model. The results from this analysis were similar to the findings of the original study for the 5 sub research questions. The second model results were statistically significant, χ^2 (2) = 167.400, $p <$ .000. The addition of all predictor variables did not improve this model's ability to predict the likelihood of student-athletes' academic success as both were 84.9%. The results of this second model for student success also indicated that the results for time spent preparing for class, time spent on cocurricular activities, gender, football, wrestling, tennis, African American, and Asian were statistically significant ($p < .05$). Also, the student-athlete race of White was significant in the first model ($p < .048$) but was not statistically significant in this second model ($p > .05$). Finally, the odds ratio for the variables in the original model were similar to the odds ratio for the variables in the second model. However, the results on female student-athletes went from .453 times more to 2.696 more likely to report that they experience academic success than males. For the second model, the variance was 14.1 %, stronger than the original model.

Therefore, in the second model, there was stronger variance accounted for in the significant results.

Interpretation of the Findings

In this section, I discuss how the key findings of this study confirmed, disconfirmed, or extended knowledge about NCAA student-athletes' academic success by comparing the research to the literature from Chapter 2. I also review the findings of this study from the lens of Astin's (1984) student involvement theory and Kuh's (2009a, 2009b) concept of engagement.

Findings related to the Literature

The findings of the research were similar to the findings of studies I included in Chapter 2. It is important to acknowledge that giving the large sample the standard of $p < 0.5$ may be explained by the large sample and not necessarily because the model was accurate. Also, the variance in this study was relatively weak. Maloney and McCormick (1993) found that student-athletes in revenue sports performed worse than any other athletes. Their findings showed that revenue sports performed worse academically than other nonrevenue sports. This study found that football players were .266 times less likely to be academically successful, whereas tennis players were 3.504 times more likely to be academically successful. Football is a revenue sport, whereas tennis is not.

Routon and Walker (2015) used data from a longitudinal survey of college students from over 400 institutions and found that participation in college sports had a small, negative effect on GPA. However, the negative effects were stronger among males and among football and basketball players, were weaker among top students, and did not differ across race (Routon & Walker, 2015). In this study, I found that males were less likely to achieve academic success than their peers. Whereas football players were .266 times less likely to achieve academic success than their peers. The results of a logistic regression analysis of basketball by academic success was not statistically significant. Therefore, basketball was not a predictor of academic success.

Yeung (2015) also conducted research on academic success and race. Yeung (2015) found that whereas athletic participation had a positive effect on student-athletes' academic success, the benefits were not equal for White and African American students. White males benefitted more than African American and Hispanic athletes, as well as men more than women (Yeung, 2015). Similarly, the data from this study showed that females were .453 times more likely to experience academic success than males. Asian student-athletes were 4.366 times more likely to experience academic success, Black or African American student-athletes were .396 times less likely to experience academic success, and White student-athletes were 1.587 times more likely to experience academic success.

Research on gender has found that women on top athletic teams academically outperformed men on top athletic teams (Bailey & Bhattacharyya, 2017). Ridpath et al. (2007) analyzed academic integrity and NCAA Division I athletics. Their data showed that women displayed higher performance on the academic indicators of ACT score, SAT score, core course GPA, and current college GPA. Ridpath et al.'s (2007) study was consistent with other research that found that males involved in revenue sports performed worse than females involved in revenue sports and students in other nonrevenue sports

(Ridpath et al., 2007). Also, Zacherman and Foubert (2014) analyzed NSSE data on student-athletes and found that women performed better than men academically. In this study, I found that females were .453 times more likely to experience academic success than males.

The data from this study showed that time spent preparing for class and time spent participating in cocurriculars were not predictors of academic success. The logistic regression analysis of time spent preparing for class by academic success and time spent participating in cocurricular activities by academic success were not statistically significant. Those findings from this study are different from Umbach et al. (2006) who found that female athletes were slightly more likely to interact and engaged academically (Umbach et al., 2006). The findings from this study were also different from Woods et al. (2018) who found that spending time working on homework, perceiving a higher institutional expectation for their academic performance, and preparing for a class were most engaging for African American student-athletes (Woods et al., 2018). Finally, the findings from this study were also different from Zacherman and Foubert (2014) who found that women performed better when they were involved in cocurricular activities, that men's academic performance improved with up to 10 hours per week of involvement in cocurricular activities, and that there was a decrease in men's GPA with higher levels of involvement.

Findings related to the Theoretical Framework

The findings from this research also related to the theoretical framework that guided this research study. The theoretical framework for this study is influenced by

Astin's (1984) student involvement theory and Kuh's (2009a, 2009b) concept of engagement. Astin's (1984) student involvement theory, active student participation is viewed as an important aspect of the learning process in higher education. Astin (1984) argued that involvement requires a continuous investment of qualitative and quantitative psychosocial and physical energy. The educational benefits are related to the extent to which students are involved, and academic performance is correlated with the student involvement (Astin, 1984). So extensive time investment in one activity, athletics, may be contributing to academic success for those who completed the NSEE survey.

According to Ku (2009a) the term *engagement* usually represents "constructs such as quality of effort and involvement in productive learning activities" (Kuh, 2009a, pg. 6). Ku (2009b) argued that student engagement represents the effort and time that student dedicate to activities that are aligned with their desired college outcomes and what institutions do to encourage students to participate in the activities (Kuh, 2009b). In this study, engagement did not predict academic success. The results of time spent preparing for class and time spent on cocurriculars as predictors of academic success were not statistically significant. However, of the three types of sports the predicted academic success, one predicted an increase in academic success. Student-athletes involved in tennis were 3.504 times more likely to be academically successful. Therefore, it could be argued that engagement and involvement in tennis was related to positive academic performance.

While there was one similarity, the majority of the research from this study was not supported by Astin's (1984) theory of involvement or by researchers who have recently applied Austin's theory. In this study, a binomial logistic regression analysis found no statistical significance in the predictability of time spent preparing for class and time spent on cocurricular activities. Therefore, research from Chapter 2 on involvement did not support the findings in this study's analysis. Researchers that used Austin's theory but found results different from this study include, Schroeder (2000) who claimed that Astin's (1984) statement that excessive amounts of involvement in one activity may become counterproductive. Therefore, student-athletes might be spending too much time on their athletics and not engaging in other beneficial activities and this could hinder their academic success (Schroeder, 2000). Other researchers found a mix of involvements advanced satisfaction or academic success. For instance, in related studies, Webber et al. (2013) found that students who spent more time studying, participating in community service, and engaged in interactions with faculty reported higher satisfaction with their overall college experience. Iacovone (2007) found a significant positive correlation between a student-athletes' GPA and having a part-time job, participating in an internship, time spent in field experience, relationship with other students, and relationship with their school's faculty. The results of this research study indicate that time spent preparing for class and time spent on cocurricular activities do not predict academic success for NCAA athletes.

Limitations of the Study

The limitations to the validity, reliability, and generalizability of the results stem from the exploratory nature of this research, the data selection, and the chosen methodology. This research was limited to NCAA student-athletes who participated in the 2018 NSSE survey. NSSE narrowed down the initial data set from 275,219 to 2,050 to develop a purposive sample of the target population for this study. In 2018, 10,243 students indicated that they were a student-athlete on a team sponsored by their institution's athletic department. The sample of 10,243 students was reduced when NSSE applied four parameters. First, they only included NCAA student-athletes. Secondly, they only included first year student athletes. Thirdly, they only included student athletes from U.S. institutions. Finally, the data used was from the 2018 survey because that was the only year NSSE had collected data on type of sport played. The data set used for this analysis consisted of 2,050 first-year, NCAA student-athletes from U.S. institutions. Once I received the data, I removed every student for whom there was missing data from the sample (n = 65). This left me with a population of 1,985. Therefore, these research findings are generalizable to those participating student-athletes on campuses similar to those who participate in the NSSE survey in the United States.

A limitation of this study pertained to the scholarly discussions regarding the validity of the NSSE. I used the NSSE's data to conduct the research study, and therefore I relied on the validity and reliability of data from an existing database. Researchers have conducted studies and found that the NSSE was both valid and reliable, and not valid or reliable. The biggest weakness of NSSE is the fact that survey method itself be faulty (Porter, 2011). Another issue with NSSE is self-selection. Participation in the NSSE is either influenced by self-selection or inability of the institution to get fair representation. For example, the 2018 survey consisted of 6,175 first-year female student-athletes and only 4,099 first-year male student-athletes. The 2018 NCAA's make-up consisted of 56%

males and 46% females, whereas this data consisted of 40.3% males and 59.7% females (The Official Site of the NCAA, n.d.). Therefore, males were underrepresented. However, for the purpose of this research, NSSE was the best fit and best choice for data. The 2018 NSSE enabled me to collect the data needed to answer the research questions.

Another limitation of this study was the self-reported letter grades. The NSSE only gathered data on students' self-reported letter grades (A, A-, B+, B, B-, C+, C, C- or lower). The survey did not ask for a percentage. Also, the survey did not gather the students' grades directly from the institution. Therefore, some students may have lied on the survey or they might not remember their overall grade average. A grade letter may not be as accurate and exact as a percentage. GPA is a common and well-known measure of academic success in the NCAA, using it to measure academic eligibility. Therefore, this is an important measure when analyzing student-athletes' academic success and some students may only care about their GPA and not know how to convert that number to a letter grade.

Another issue I had with self-reported grades was the initial standard of C or higher to represent academic success. This standard was met be every student in the NSSE data for the research. Therefore, all the students from the data sample were academically successful, by that measure. This did not allow for a binomial logistic regression analysis to test for predictability. The standard for academic success was raised from the NCAA's minimum academic eligibility requirement to the NCAA's student-athlete academic honor roll threshold to a B. This change to the dependent variable enabled a binomial logistic regression analysis.

Another limitation of this study was how the survey classified time spent on cocurricular activities. The survey question not only included time spent on sports, but also time spent on organizations, campus publications, student government, fraternity or sorority, intercollegiate or intermural sports. The survey question asked in a typical week, how much time do you spent on cocurriculars (cocurricular include spent on sports, but also time spent on organizations, campus publications, student government, fraternity or sorority, intercollegiate or intermural sports)? The students could respond with 0, 1-5, 6-10, 11-15, 16-20, 21-25, 26-30, or more than 30. Therefore, the student-athletes' response could have included other time spent on activities and the time they spend on their sport. When analyzing time spent on cocurriculars it is important to keep in mind that this is not only a measure of the amount of time a student- athlete spends on their sport, but on all cocurriculars. Future researchers may choose to analyze time spent solely on the student's sport. The results of the binomial logistic regression analysis on the predictability of time spent on cocurriculars on student-athletes' academic success was not statistically significant, χ^2 (2) = 4.892, $p > .05$. Therefore, as a predictor, time spent participating in cocurricular activities was not statistically significant ($p < .299$).

Finally, it is important to mention that the findings in this research were not exceedingly strong and did not indicate a much greater likelihood of academic success or academic struggle. In this study, the standard of $p < 0.5$ may be explained by the large sample and not necessarily because the model was accurate. Also, the variance in this study was relatively weak. Therefore, for example, the results of this study should be analyzed with an understanding that while football players were .266 times less likely to be academically successful, that number is relatively small. With the exception that tennis players were 3.504 times more likely to be academically successful and that Asian student-athletes were 4.366 times more likely to experience academic success, the other significant results were weaker, and more research should analyze the predictability.

Also, the variance for each sub RQ was below 10%. Therefore, it is important to note the low percent of variance explained by the model and consider the variance when interpreting the results. Sub RQ 1 had a variance of 2%, sub RQ2 was 1.6%, sub RQ 3 was 3.4%, sub RQ 4 was 7.2%, and sub RQ 5 was 6.8%. While these were small numbers, they still fit the data. However, there was a difference in variance between the original model and the new model. Sub RQ 1 had a variance of 2% in the original model, sub RQ2 was 1.6%, sub RQ 3 was 3.4%, sub RQ 4 was 7.2%, and sub RQ 5 was 6.8%. Again, these were small numbers, but they still fit the data. For the second model, the variance was 14.1 % this is a stronger number. Therefore, in the second model, there was stronger variance accounted for in the significant results.

Recommendations

The strengths and limitations of this study suggest that further research be conducted. One of the strengths of this study was the size and diversity of the sample. The sample analyzed consisted of 1,985 student-athletes. The participants had a similar demographic make-up as the NCAA's total student-athlete population. However, the first recommendation is that future researchers find or collect primary data tailored to the researcher's questions. The research questions were modeled after NSSE's survey questions and existing data set. It is challenging to collect new data on NCAA student-athletes. However it is not impossible. The NSSE may offer a large sample size, but it was not a primary data source to me and therefore the researcher does not have control over the questions being asked. By using NSSE data, I also had to use their survey questions and shape the research questions to fit with the data I used. For example, I had to analyze student-athletes' time spent on cocurricular rather than student-athletes' time spent on their NCAA sport. This change in question may have yielded useful statistically significant findings.

The second recommendation challenges researchers to reshape how athletics and academic success are studied. The overwhelming majority of research conducted on athletics and academic success is quantitative. The field may benefit from qualitative research that analyzes the topic from a different approach and angle. Qualitative research enables in-depth questions and responses that may provide new answers and information on student-athletes. This research provided some information on what factors may predict the likelihood of a student-athlete's academic success.

Implications

Based on the findings in this research, there are theoretical, practical, and social change implications. This study's findings also have implications regarding the gap in knowledge and timely discussions surrounding NCAA student-athletes. Since the NCAA recently changed their requirements for time-off from athletics for students, there have been concerns about overworking student-athletes. The NCAA used to guarantee all Division I student-athletes at least one day off per week during their regular season. However, as of June 2018, the new rule enables schools to eliminate the one day off per week rule. A school can schedule three regular-season games in a week and provides athletes with 2 days off in their previous or subsequent week. Therefore, this can create, in a 28-day work cycle, a pattern that NCAA student-athletes can be forced to dedicate 24 days straight to athletics and be off from athletics only on days 1 and 2, and 27 and 28 (Edelman, 2018). This study found that time spent preparing for class and time spent participating in cocurricular activities did not significantly predict academic success. In fact, 99% of NCAA student-athletes from this study's data were achieving academic eligibility of a letter grade of C or higher. Since NSSE data was collect from February through May 2018 and this rule was affective June 2018, future NSSE data should revisit these questions and concerns to monitor any changes, as academic success may suffer. However, for now, based on this research, the amount of time a student-athlete dedicates to class and their sport did not predict academic success.

Theoretical Implications

The findings from this research may also have theoretical implication. In Astin's (1984) student involvement theory, active student participation is viewed as an important aspect of the learning process in higher education. Kuh (2009b) stated that participating in cocurricular activities such as sports is an enriching educational experience. Also, student engagement represents the effort and time that students dedicate to activities that are aligned with their desired college outcomes and what institutions do to encourage students to participate in the activities (Kuh, 2009b). In this study, the research questions on student engagement did not result in statistically significant findings. However, researchers have already supported Astin's (1984) and Kuh's (2009b) statements about the benefits of involvement, engagement, and extra-curricular activities on academic performance (Aljarallah & Bakoban, 2015; Bowen & Greene, 2012; Bradley et al., 2012; Castelli et al., 2014; Insler & Karam, 2017; Schultz, 2016; Yeung, 2015).

Time spent preparing for class and time spent participating in cocurricular activities did not predict academic success. However, tennis did predict an increase in academic success. Therefore, the findings of this research provided information that could help institutions understand that the type of sport a student-athlete is involved and engaged in can predict academic success. Engagement in tennis predicted an increase in academic success, whereas engagement in football and wrestling predicted a decrease in academic success. As mentioned, the findings in this research were not exceedingly strong and did not indicate a much greater likelihood of academic success or academic struggle. However, tennis players were 3.504 times more likely to be academically successful and Asian student-athletes were 4.366 times more likely to experience academic success. Despite other independent variables having significant results, the results were weaker, and more research should analyze the predictability to help support this claim.

Implications for Practice

The findings from this research may have implications for practice. The findings indicated that males, Black or African American student-athletes, football players, and wrestlers were less likely to achieve academic success than their peers. Whereas female, White and Asian student-athletes and tennis players were more likely to achieve academic success than their peers. Therefore, this research could have implications for the listed groups. Institutions, academic advisors, or other stakeholders involved in student-athletes' academics may use this research to change their methods to help make improvements amongst the groups of student-athletes predicted to be less likely to succeed. Stakeholders might also wish to compare and contrast the groups of students likely to achieve and the group of students less likely to achieve. For example, what resources or support are tennis players receiving and using compared to football players or wrestlers? Institutions might also use this research to foster a learning environment focused on equal opportunity. For example, are Black or African American males being offered the same resources as White females, and if not, analyzing what barriers might be preventing one group from achieving academic success more than another. Since the findings in this research were not exceedingly strong and did not indicate a much greater likelihood of academic success or academic struggle institutions may choose to look within their own student-athlete body and see if there are similar trends.

NCAA athletic departments have staffed academic advisors on location specifically for their student-athletes. The findings of this research can be used to better advise student-athletes because stokeholds know which groups are at risk and which are more likely to succeed. The findings can be used in the following ways. First, academic advisors can predict which groups may be facing the biggest challenges academically. Secondly, academic advisors can predict which students are going to succeed. Therefore, academic advisors should be aware of the students at risk and proactively encourage intervention. Academic advisors can focus energy on at-risk students and explore interventions best suited for the at-risk student-athletes.

To remain academically eligible to complete at the NCAA level, students must achieve academic success and hold a GPA of C or higher. Whereas 99% of all participants from this data set were achieving the minimum level of academic eligibility, athletic departments may strive beyond that threshold. Athletic departments may set out to encourage more students to achieve academic honor roll. The first step in implementing an action plan to help students achieve academic success is to establish which students are achieving and which are not. With this information, the next step may be to determine the best interventions for the students whom need it. I would encourage institutions with academic challenges and student-athletes who are not meeting the NCAA academic eligibility requirements to explore future research options that could use the findings from this study to then look into appropriate interventions and solutions.

Conclusion

Researchers have already studied the positive influence that athletic participation has on academic performance (Aljarallah & Bakoban, 2015; Bowen & Greene, 2012; Bradley et al., 2012; Castelli et al., 2014; Insler & Karam, 2017; Schultz, 2016; Yeung, 2015). While researchers have focused on NCAA student-athletes and race, division, gender, in-season versus out of season athletic participation, and major, much of that research was inconclusive or showed little relationship between the listed variables (Beron & Piquero, 2016; Bimper, 2014; Robst & Keil, 2000; Schultz, 2016).

The NCAA is frequently changing its policies and those changes may affect their student-athletes' academic success. For example, the NCAA has recently changed their requirements for time-off from athletics for students. Student-athletes have also indicated that time management is the most difficult aspect of being a varsity athlete (Rothschild-Checroune et al., 2012). The other issue within the NCAA is understanding academic eligibility. I had been unable to find recent studies that demonstrate how demographic variables or engagement variables are related to academic success. Most of the data focuses on comparing nonathlete students with student-athletes.

This research has highlighted positive social change implications. This research can be used to help ensure that college student-athletes continue to achieve academically, and it may also provide insight into factors affecting college student-athletes' academic success. This research could help gain insight into two major areas of concern within the NCAA: factors affecting academic eligibility and student-athlete time commitments. This research may have produced useful information and data for the NCAA and its members, individual institutions, athletic directors, coaches, student-athletes, academic advisors, and researchers with recent research on the issues. Helping improve the academic outcomes of college student-athletes may also help society because it could increase the chances that students are learning, graduating, not waste federal aid or be crippled by student debt, and continue being contributing positive members of our society.

Despite the positive social change implications, it is also important to note that the findings in this research were not exceedingly strong and did not indicate a much greater likelihood of academic success or academic struggle. The standard of $p < 0.5$ may be explained by the large sample and not necessarily because the model was accurate. Also, the variance in this study was relatively weak. Also, the variance for each sub RQ was below 10%. Therefore, it is important to note the low percent of variance explained by the model and consider the variance when interpreting the results. Therefore, the results of this study should be analyzed with an understanding that while football players were .266 times less likely to be academically successful, that number is relatively small. Additional research should be conducted to better understand factors that predict student-athletes' academic success.

York et al. (2015) used Astin's (1984) student involvement theory and argued that college academic success could be understood by analyzing three factors. The first is inputs and inputs include demographic characteristics and the student's existing social and academic experiences. The second factor is the environment, and the environment includes the programs, policies, and experiences encountered in college. The last factor is the outcomes and outcomes include the students' characteristics, skills, attitude, values, knowledge, behaviors, and beliefs they have as they leave college (York et al., 2015). This research analyzed how inputs such as demographic characteristics, how the environment such as time spent on academics, athletics and other commitments, and how outcomes such as grades are related. The results indicated that males, wrestlers, football players, and Black or African American student-athletes are less likely to achieve academic success than their peers. Females, tennis players, and both White and Asian student-athletes are more likely to achieve academic success than their peers. Also, the engagement factors of time spent preparing for class and time spent participating in cocurricular activities did not predict academic success.

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Appendix: 2018 Selected NSSE Survey Questions

1. About how many hours do you spend in a typical 7-day week doing the following?

    A) Preparing for class (studying, reading, writing, doing homework, or lab work, analyzing data, rehearsing, and other academic activities?

    - 0, 1-5, 6-10, 11-15, 16-20, 21-25, 26-30, More than 30

    B) Participating in cocurricular activities (organizations, campus publications, student government, fraternity or sorority, intercollegiate or intramural sports, ect.)

    - 0, 1-5, 6-10, 11-15, 16 -20, 21-25, 26-30, More than 30

2. What is your class level?

    - Freshman/first-year, Sophomore, Junior, Senior, Unclassified

3. What have most of your grades been up to now at this institution?

    - A, A-, B+, B, B-, C+, C, C- or lower

4. What is your gender identity?

    - Man,Woman, Another gender identity, please specify:, I prefer not to respond

5. What is your racial identity?

    - American Indian or Alaskan Native, Asian, Black or African American, Hispanic or Latino, Native Hawaiian or Other Pacific Islander, White, Other, I prefer not to respond

6. Are you a student-athlete on a team sponsored by your institution's athletics department?
    - Yes, No
7. What sport do you play?
    - Baseball, Basketball, Bowling, Cheerleading or Dance/Pom Squad, Cross Country, Fencing, Field Hockey, Football, Golf, Gymnastics, Ice Hockey, Lacrosse, Riffle, Rowing, Skiing, Soccer, Softball, Swimming & Diving, Tennis, Track & Field, Volleyball/Beach Volleyball, Water Polo, Wrestling, Other, More than one team selected