IMPACTS OF RECREATIONAL SPORTS PARTICIPATION ON COLLEGE STUDENT ACADEMIC SUCCESS

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ABSTRACT

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Recreational sports departments provide a major access point to physical activity opportunities on college campuses through programming and services. However, many are constrained by current funding environments and must demonstrate their contributions to student success in order to maintain adequate funding. Theories of student success support that involvement outside the classroom is vital to student persistence and overall academic success. Current research supports small, positive relationships between recreational sports participation and student success. However, limitations in study design and methodology are prevalent. Therefore, the purpose of this dissertation was to further investigate relationships between recreational sports participation and academic success while addressing some of these limitations.

Three studies were conducted using three different datasets. The first evaluated club and intramural sports participation and self-report grade average using a national-level dataset from the American College Health Association (ACHA) National College Health Assessment (NCHA). Study participants included those responding to the ACHA-NCHA between Fall 2008 and Fall 2010 periods (total respondents = 178,091; analytic sample = 85,316). Multinomial logistic regression was used to evaluate the role of participation in club and/or intramural sports on self-reported grade averages while adjusting for significant covariates. In general, sport participants were more likely to report higher grade averages than non-participants, and the strongest relationships were found for club sport participants.

The second study investigated relationships between intramural sports participation during the first year of college and academic success indicators using an institutional dataset. Data were collected from university databases. Matched samples (N=1,796; 898 pairs) were generated based on demographic variables. Paired sample t-tests and logistic regression were used to assess differences between participants and non-participants. Participants of intramural sports earned higher grade point averages, lower credit differences (credits attempted - credits completed), were more likely to be retained after the first year, and were more likely to achieve sophomore status after the first year than non-participants.

The third dissertation study involved a national-level dataset that included five years of the NASPA Assessment and Knowledge Consortium Recreation and Wellness Benchmark. This study investigated relationships between recreational sports participation (in terms of number of activities and time investment) and academic success indicators. Multinomial logistic regression was used to evaluate the role of participation on student success while adjusting for significant covariates. Students participating in a moderate number of activities and a high time investment were more likely to self-report higher anticipated term GPAs than non-users. No significant relationships were found for likelihood of retention next term.

Overall, dissertation results support previous literature and suggest that recreational sports participation is positively related to academic success in college students. Additionally, two large, national datasets were evaluated and provide more generalizable results than previous work. Future research should investigate national datasets that include objectively collected data (i.e., from university databases), and further investigate frequency of participation.

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PREFACE

This dissertation is organized into six chapters. Chapter one includes the introduction, specific aims, and hypotheses. Chapter two is a review of the literature related to the specific aims organized as a systematic review manuscript (abstract, introduction, methods, results, discussion, and references). Chapter three is organized as a manuscript (abstract, introduction, background, methods, results, discussion, and references) which has been accepted for publication in the *Recreational Sports Journal*. Chapters four is organized as a manuscript (abstract, introduction, background, methods, results, discussion, and references) and is published in the *Journal of College Student Retention*. Chapters five is organized as a manuscript (abstract, introduction, background, methods, results, discussion, and references) and is currently under review with the *Journal of Student Affairs Research and Practice*. Chapter three addresses specific aim one, chapter four addresses specific aim two, and chapter five addresses specific aims. All findings are summarized in chapter six.

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CHAPTER ONE:

INTRODUCTION

The college years are considered a 'critical window' in time when it comes to the development of positive health behaviors (Bray et al., 2011). This is often the first time that students are exposed to opportunities for decision making, which includes decisions about the role of physical activity and exercise on health and wellness (McInnis, 2001; Nelson, Neumark-Stzainer, Hannan, Sirard, & Story, 2006). Trends show that physical activity levels decline with age (Sallis, 2000), with a marked decrease as adolescents transition to young adulthood (Douglas et al., 1997; Kwan, Cairney, Faulkner, & Pullenayegum, 2012; Zick, Smith, Brown, Fan, & Kowaleski-Jones, 2007). Previous research has also found that physical activity levels during college can impact physical activity levels later in life (Forrester, Ross, Hall, & Geary, 2007; Sparling & Snow, 2002), and in particular the first year of college is an influential time (Bray & Born, 2004; Gyurcsik, Bray, & Brittain, 2004).

A major access point to physical activity on college campuses are the recreational sports facilities and programs. With a plethora of information and activities, campus recreation departments can serve as a valuable resource to students. However, as with other student affairs divisions, campus recreation departments have been tasked with demonstrating their contributions to student success to maintain funding (Haines, 2001). Without sufficient funding, these departments cannot provide adequate facilities and programs to serve the physical activity needs of students.

Student success models, such as Astin's Theory of Student Involvement and Tinto's Model of Student Departure, support the notion that student engagement in activities outside of

the classroom can be an important contributor to college student academic success (Astin, 1975, 1999; Tinto, 1987, 1999, 2006). Opportunities and experiences available within campus recreation programs and facilities have a strong alignment with the postulates of these theories. Previous research has identified positive relationships between recreational sports participation and academic success indicators such as retention (Belch, Gebel, & Maas, 2001; Danbert, Pivarnik, McNeil, & Washington, 2014; Forrester, 2015; Henchy, 2011; Huesman, Brown, Lee, Kellogg, & Radcliffe, 2009; Kampf & Teske, 2013; McElveen & Rossow, 2014), GPA (Belch et al., 2001; Danbert et al., 2014; Huesman et al., 2009; Kampf & Teske, 2013; McElveen & Rossow, 2014), credits completed (Belch et al., 2001; Danbert et al., 2014), class standing (Danbert et al., 2014), graduation rates (Huesman et al., 2009), and various social factors such as sense of belonging (Henchy, 2011; Miller, 2011).

However, there are gaps in the recreational sports literature concerning student participation and relationships with academic success. Few studies have used appropriate statistical methodology, such as control for confounding variables that could impact relationships. Additionally, there is a lack of investigation into national datasets encompassing multiple universities that provide a representative sample for study. Further work is needed in this area to address these major limitations and strengthen the argument that campus recreation departments contribute to student success.

RESEARCH AIMS

Specific Aim 1: To determine the relationships between club and intramural sports participation and self-reported grade average in college students using American College Health Association National College Health Assessment data.

H 1.1. Club sports participants will self-report higher grade averages than non-participants.

H 1.2. Intramural sports participants will self-report higher grade averages than non-participants.

H 1.3. Students participating in both club and intramural sports will self-report higher grade averages than non-participants.

Specific Aim 2: To evaluate the relationships between intramural sports participation and academic success indicators (grade point average, credit difference, 1-year retention, and achievement of sophomore status) in university freshmen following their first year.

H 2.1. Intramural sports participants will have higher grade point averages at the end of their first year than non-participants.

H 2.2. Intramural sports participants will have lower credit differences at the end of their first year than non-participants.

H 2.3. Intramural sports participants will be more likely to be retained at the one-year mark than non-participants.

H 2.4. Intramural sports participants will be more likely to achieve sophomore status following their first year than non-participants.

Specific Aim 3: To evaluate the relationships between recreational sports participation (numbers of activities and amount of time invested) and academic success indicators (self-reported anticipated semester GPA and self-reported likelihood of retention).

H 3.1. Students participating in greater numbers of activities will self-report higher anticipated semester GPAs than non-participants and students participating in fewer numbers of activities.

H 3.2. Students investing greater amounts of time will self-report higher anticipated semester GPAs than non-participants and students investing lower amounts of time.

H 3.3. Students participating in greater numbers of activities will be more likely to self-report remaining at their universities than non-participants and students participating in fewer numbers of activities.

H 3.4. Students investing greater amounts of time will be more likely to self-report remaining at their universities than non-participants and students investing lower amounts of time.

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CHAPTER TWO:

REVIEW OF THE LITERATURE

ABSTRACT

Recreational sports departments provide a major access point to physical activity on college campuses. They can provide programming and services that appeal to a wide range of physical activity and sport interests, are accessible, and are inclusive in the campus community. However, many are constrained by current funding environments and must demonstrate their contributions to student success in order to maintain adequate resources for programming and services. Theories of student success and development posit that involvement outside the classroom is vital to student persistence and overall success. Current research supports a small, positive relationship between recreational sports participation and academic success in college students. The purpose of this paper is to review the current literature pertaining to recreational sports and academic success in college students. Overall, results are supportive of positive relationships between recreational sports participation and student success indicators, however, much of the literature is limited by sample size and methodology.

INTRODUCTION

During their time in college, students are exposed to new opportunities for decision making, including decisions about health behaviors (McInnis, 2001; Nelson, Neumark-Stzainer, Hannan, Sirard, & Story, 2006), and previous research has shown that physical activity levels during college can have an impact on physical activity levels later in life (Forrester, Ross, Hall, & Geary, 2007; Sparling & Snow, 2002). In particular, the first year of a student's college career

is a vital impact point; previous research has shown that students' physical activity levels decline substantially during the first semester at a university compared to physical activity levels in the year prior to attendance (Bray & Born, 2004; Gyurcsik, Bray, & Brittain, 2004). Overall, the literature suggests that the first year may be a 'critical window' for physical activity promotion and interventions to reduce physical activity declines (Bray et al., 2011).

Various initiatives have been developed that focus on physical activity behaviors of students attending colleges and universities (Healthy Campus Initiative, Healthy People 2020, Exercise is Medicine on Campus, etc.). Despite growing support for physical activity promotion efforts on college campuses (Leslie, Sparling, & Owen, 2001), physical activity levels in college students are still low. Per the Spring 2018 American College Health Association (ACHA) National College Health Assessment (NCHA), only 46.2 percent of students report meeting ACSM physical activity guidelines, which has been consistent over time (American College Health Association, 2018).

There are numerous avenues for physical activity on college campuses, but one that is easily accessible for most students is through services and facilities provided by university recreational sports departments. Recreational sports departments provide a variety of options for physical activity including intramural and club sports, group fitness classes, fitness facility access, and open recreation areas (e.g., basketball courts, volleyball courts, swimming pools, etc.). As with other departments within student affairs, to maintain funding to support student needs, recreational sports departments have been tasked with examining the relationship between student academic success and participation in their services (Haines, 2001). Assessments are needed to provide rationale for the current existence and future funding of programming and facilities (Haines, 2001). Without funding, departments will not be able to support the physical

activity needs of campus communities, and overall health and wellness of the student body could suffer.

There are many models to predict academic success in the student affairs literature, however, Astin's Theory of Student Involvement and Tinto's Model of Student Departure are most applicable within the context of recreational sports. These theoretical frameworks provide support for the existence of a relationship between participation in recreational sports and indicators of academic success in college students.

Astin's theory posits that student academic success is dependent on the connection and involvement a student has with his or her university (Astin, 1999). This theory centers around 5 basic postulates: 1) involvement in the investment of physical and psychological energy in objects; 2) involvement occurs along a continuum; 3) involvement is both quantitative and qualitative; 4) student learning and professional development are directly proportional to involvement quantity and quality; and 5) effectiveness of educational policy and practice is directly related to the capacity for student involvement (Astin, 1999). A longitudinal study by Astin found that factors within the college environment that promote involvement were factors associated with student persistence, and participation in extra-curricular activities was an example of one of these factors (Astin, 1975).

Recreational sports is an extra-curricular activity accessible by students on college campuses. This further fits into Astin's theory as it can blends with most of the postulates that Astin presents: recreational sports participation is both a physical and psychological investment of energy (postulate 1); participation can occur at different levels on a continuous scale and it can be measured for level of involvement (postulate 2); and we can quantify participation as well ask students to provide qualitative insight into the benefits of participation (postulate 3). Recreational

sports can play a vital role as access to involvement for many students as there are a variety of avenues for participation (i.e., club sports, fitness center usage, group fitness participation, intramural sports, outdoor recreation, etc.). While many postulates of Astin's theory can be supported by the current recreational sports literature, several need further evaluation to provide support for the relationship between frequency and quality of recreational sports participation and academic success, and for the effectiveness of university policy supporting recreational sports participation and the level of student involvement associated with academic success.

While Astin's theory explains the importance of student involvement, Tinto's theory builds further upon this notion in the importance of timing and transition of this involvement. As is the case with Astin, Tinto's Theory of Student Departure centers on the level involvement a student has with his or her university (Tinto, 1999, 2006). For many, this connection is made within the first year of attendance, and Tinto's theory dictates that the first year of college is extremely important for future academic success (Tinto, 1999, 2006). Tinto's theory contains three stages for the integration of a student into the academic and social system of a university: separation, transition, and incorporation (Tinto, 1999, 2006). As integration occurs, students separate from previous norms or beliefs that they had before entering the university community (Tinto, 1999). For some, sport and/or physical activity participation may have been a norm and will continue to be a norm, indicating a low level of separation. Transition occurs as students move from previous beliefs and norms to the new beliefs and norms they are incorporating into their lives as college students (Tinto, 1999). Previous literature has identified young adulthood, which for many contains the college years, as having an impact on physical activity and sport participation later in life (Forrester et al., 2007; Leslie et al., 2001; Sparling & Snow, 2002). Tinto's theory supports the process of developing those habits within a contextual model of

student involvement at a university, which can then result in academic success because of integration into the campus community through the avenue of recreational sports participation.

With the important role that recreational sports departments can play in academic success of students, it is important to explore the body of literature currently available. The purpose of this paper is to summarize and evaluate the current research relevant to recreational sports participation and academic success indicators such as grade point average, retention, credit variables, and class standing.

METHODS

Literature Search

A literature search was conducted using an institutional library system with access to 1,066 databases. Articles were searched by combining variations of the keywords "recreational sports" or "campus recreation," "academic success" or "student success," and "college students". Search areas included title, abstract, and subject terms. Additionally, specific journals relevant to the field, such as the *Recreational Sports Journal,* were searched for article titles.

Inclusion Criteria

In total, entering combinations of search terms returned 161 hits. To select appropriate studies inclusion and exclusion criteria were used. Exclusion criteria were applied first, and articles were excluded if 1) they were unpublished dissertations or theses, and 2) if the study focused only on college student varsity athletes. Following exclusion criteria, 60 articles remained.

Studies were included if 1) they contained a measure of recreational sports participation, 2) they contained a measure of academic success, and 3) included only college students as

participants. The screening of articles for inclusion criteria took place by an independent coder reviewing and classifying abstracts. This process resulted in 21 articles remaining. Full text articles were retrieved and after further inspection by the author resulted in 19 relevant studies for this review. See figure 2.1 for a diagram depicting this process.

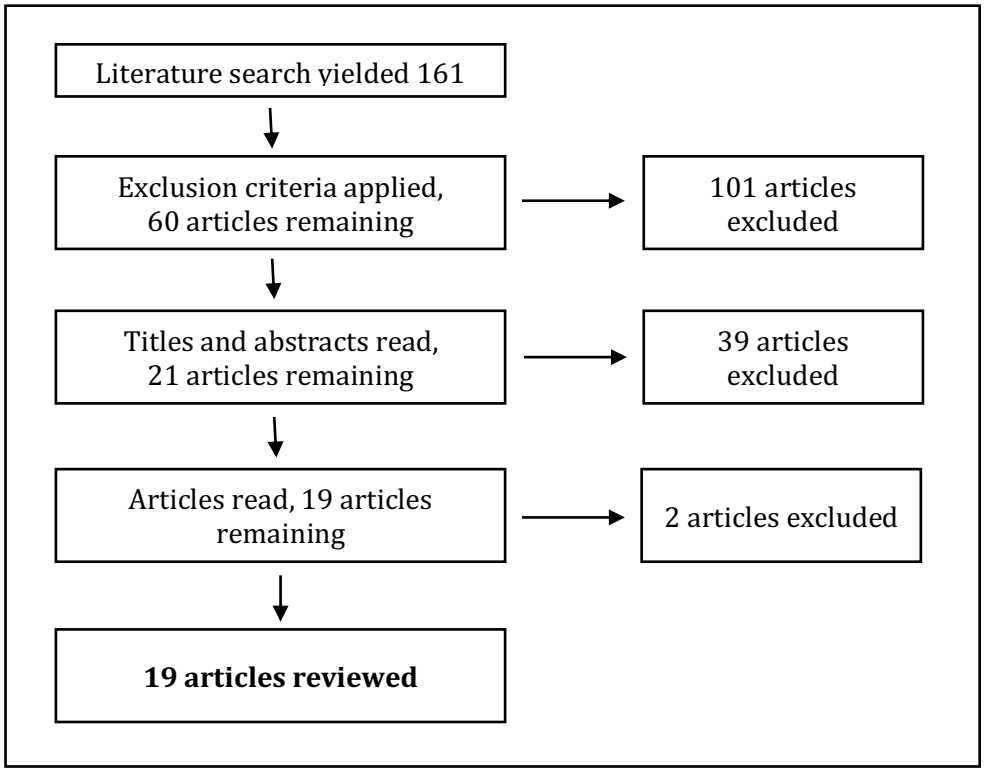

Figure 2.1

Search process and results for article identification

RESULTS

Student academic success is commonly defined by grade point average (GPA) and persistence/retention, however other variables such as credits completed have also been

investigated. Previous research pertaining to recreational sports participation and academic success has focused on retention, followed by GPA, and then credit based variables and class standing. A summary of study characteristics can be found in table 2.1.

Retention

Fourteen studies were identified that investigated the relationships between recreational sports and likelihood of retention at a university. These studies utilized various methods, including surveys and objective measures (i.e. data from university registrar offices, identification card swipes) for participation and retention variables, and include primarily single institution studies along with one study representing a national sample (Forrester, 2015).

Nine studies relied on survey methods (Bradley, Phillipi, & Bryant, 1992; Bryant, 1995; Forrester, 2015; Haines, 2001; Henchy, 2011; Lindsey & Sessoms, 2006; Lindsey, Sessoms, & Willis, 2009; Mallinckrodt, 1987; Miller, 2011). One of the first studies evaluating recreational sports and retention was conducted by Mallinckrodt and Sedlacek (1987), who surveyed second semester freshmen and found that hours spent at the on-campus gym facilities were significantly related to spring-to-fall retention in African American students. Miller (2011) surveyed undergraduate students of all grade levels using an original survey and found that there was a significant relationship between persisting at the university and involvement in student recreation center activities. The seven remaining studies that used self-report and used or adapted questions from the NIRSA Quality and Importance of Recreational Services (QIRS) survey to evaluate recreational sports impact on student retention (Bradley et al., 1992; Bryant, 1995; Forrester, 2015; Haines, 2001; Henchy, 2011; Lindsey & Sessoms, 2006; Lindsey et al., 2009). A primary question from the NIRSA QIRS that was used or adapted was: “In deciding to continue at [university], how important to you was the availability of recreational facilities and programs?”

Results from this question were typically categorized based on a Likert scale of importance with results ranging from "Not Important" to "Very Important" (Bryant, 1995). Bryant (1995) and Bradley et al (1992) developed and piloted this survey and found that almost one-third of students reported that recreational facilities and program were important factors when deciding to continue at the university, and African American students were more likely to report this than Caucasian students. Haines (2001), Henchy (2011), Lindsey and Sessoms (2006), and Lindsey et al. (2009) utilized this question from the QIRS in similar studies and found results varying from 31 percent to 75 percent of students indicating that recreational facilities and programs were important for their continuation at their universities. In a 2015 study, Forrester evaluated a national sample of undergraduate students using similar questions to the QIRS and found that over two-thirds of students indicated that recreational sports facilities and programs were important in their decisions to continue at their current universities. Additionally, there were significant relationships for the depth/frequency of participation and the breadth/variety of participation with students who participated more in both depth and breadth indicating greater importance on facilities and programs for their continuation at their current university.

Moving beyond the use of self-reported data, five studies were identified that utilized objective measures for recreational sports participation and collection of retention data (Belch, Gebel, & Maas, 2001; Danbert, Pivarnik, McNeil, & Washington, 2014; Huesman, Brown, Lee, Kellogg, & Radcliffe, 2009; Kampf & Teske, 2013; McElveen & Rossow, 2014). Belch and colleagues (2001) investigated relationships between recreation center usage and one-semester (fall-to-spring) and one-year retention (fall-to-fall) in freshmen students and found that users had higher retention rates than non-users at both time points. Huesman et al. (2009) developed a logit model that evaluated university recreation center usage and likelihood of first-year retention

while controlling for other variables that could impact academic success. Based on the model developed, results indicated that students using the recreation center one standard deviation above the average (approximately 25 times per semester) increased their likelihood of retention by 1 percent. Kampf and Teske (2013) also adjusted for confounding variables in an analysis of both club sport participation and recreation center usage in freshmen students. These authors found that club sports participants were more than twice as likely to be retained at the one-year mark than non-participants, and recreation center users were almost 1.5 times more likely to be retained than non-users. McElveen and Rossow (2014) evaluated intramural sports participation and retention rates, however, formal statistical analyses were not conducted. Overall, retention rates indicate that there is a relationship between participation and fall-to-spring, spring-to-fall, and fall-to-fall retention in freshmen students. Danbert et al. (2014) investigated differences in one and two-year retention rates between members and non-members of the on-campus fitness facility. Significant results were found for two-year retention rates, with members have a greater retention rate than non-members.

Overall, research indicates a positive relationship between recreational sports participation and retention with only two studies that found no association for specific populations (Mallinckrodt, 1987) or specific retention variables (i.e., 1-year retention versus 2-year retention) (Danbert et al., 2014). However, there are limitations to many of the studies reviewed here. Several relied on self-reported methods rather than objective measures for participation and retention, few assessed frequency of participation, and only two studies were identified that considered the impact of confounding variables in analyses. Future research should focus on better quantifying frequency of participation in recreational sports opportunities and adjusting for other variables that could also impact retention.

Grade Point Average

Nine studies were identified that evaluated the relationship between recreational sports and GPA and included a variety of methods (i.e., self-report versus objective database measures) to investigate these relationships (Belch et al., 2001; Danbert et al., 2014; Frauman, 2005; Gibbison, Henry, & Perkins-Brown, 2011; Kampf & Teske, 2013; McElveen & Rossow, 2014; Todd, Czyszczon, Wallace Carr, & Pratt, 2009; Watson, Ayers, Zizzi, & Naoi, 2006; Zizzi, Ayers, Watson, & Keeler, 2004).

When evaluating the literature based on the methodology used, six of nine studies utilized objective measures from university databases for both recreational sports participation/membership and academic measures (Belch et al., 2001; Danbert et al., 2014; Gibbison et al., 2011; Kampf & Teske, 2013; McElveen & Rossow, 2014; Todd et al., 2009). Belch et al. (2001) found significant relationships between participation and first-term GPAs, and trends that indicate a relationship between frequency of usage and GPA in freshmen students. Todd et al. (2009) investigated undergraduate students of all class levels and found that students using the facilities at higher rates earned significantly higher GPAs than students using facilities at lower rates or not at all. Results from Gibbison and colleagues (2011) showed that freshmen students who utilized the recreation center 20 times or more during their first semesters earned significantly higher first-semester GPAs than their peers who used the center less frequently. Additionally, students who increased their recreation center usage over time, from less than 20 uses to 20 or more uses, also increased their GPAs. Danbert and colleagues (2014) assessed relationships between recreation facility membership and GPA and found that members had significantly higher GPAs than non-members at the end of their second year. Kampf and Teske (2013) found mixed results with significant correlations for use of the recreation facility

and GPA, but no significant relationships for club sport participation and GPA. McElveen and Rossow (2014) were the only investigators to find no significant relationships between participation and first-semester GPA in freshmen students playing intramural sports.

The remaining three studies used self-report via survey measures (Frauman, 2005; Watson et al., 2006; Zizzi et al., 2004). Zizzi et al. (2004) conducted a survey study including undergraduate students of all grade levels and found no significant differences in self-reported GPA between students reporting usage of recreational sports and students who did not. Frauman (2005) and Watson et al. (2006) found similar results when also evaluating undergraduate students of all grade levels.

Overall, when considering study limitations present, the literature supports a positive relationship between recreational sports and GPA. Four studies found a positive association between recreational sports participation and GPA (Belch et al., 2001; Danbert et al., 2014; Gibbison et al., 2011; Todd et al., 2009), four studies found no association (Frauman, 2005; McElveen & Rossow, 2014; Watson et al., 2006; Zizzi et al., 2004), and one study found mixed results based on the aspect of recreation assessed (Kampf & Teske, 2013). A major limitation to much of this literature is that only three studies considered adjustment for potentially confounding variables that can impact GPA (Danbert et al., 2014; Gibbison et al., 2011; Todd et al., 2009). Additionally, only three studies evaluated frequency of use with formal statistical analyses (Gibbison et al., 2011; McElveen & Rossow, 2014; Todd et al., 2009). Future research should use objective measures for both usage and academic variables, consider frequency of use in analysis, and conduct analyses adjusted for potentially confounding variables in the relationship between recreational sports participation and GPA.

College Credits and Class Standing

Literature pertaining to the relationship between recreational sports and the completion of college credits is very limited. Two studies were identified that focused on cumulative credits earned (Belch et al., 2001; Danbert et al., 2014). Additionally, one of these studies evaluated credits relative to the achievement of sophomore class standing as well (Danbert et al., 2014).

Belch et al. (2001) found that recreation center users earned significantly more credits at the end of their first year than non-users. Danbert and colleagues (2014) found similar results when investigating differences in credits completed between members and non-members of the on-campus recreation facility at the end of their second year. Danbert and colleagues also assessed differences between members and non-members for the likelihood of achievement of sophomore status following two consecutive semesters and found that members were more likely to achieve sophomore status than non-members.

Overall, although positive results were found, more research is needed to make assumptions about the relationships between recreational sports and credits completed and class standing. Future research should also consider other ways to evaluate course credit-based measures of success. Credits completed does not indicate how many credits were initially attempted by the students, and may not be the best measure for assessment in the early semesters of a student's academic progress.

Table 2.1

Summary of study characteristics

Authors	Design	Sample Size	Population	Outcomes
Belch, Gebel & Maas (2001)	Objective	11,076	Freshmen	GPA, Retention
Bradley, Phillipi & Bryant (1992)	Self-Report	200	Undergraduates	Retention
Bryant (1995)	Self-Report	2,586	Undergraduates	Retention
Danbert, Pivarnik, McNeil & Washington (2014)	Objective	4,843	Freshmen	GPA, Retention, Cumulative Credits, Class Standing
Forrester (2015)	Self-Report	33,522	Undergraduates	Retention
Fraumen (2005)	Self-Report	389	Undergraduates	GPA
Gibbison, Henry & Perkins-Brown (2011)	Objective	2,472	Freshmen	GPA
Haines (2001)	Self-Report	374	Undergraduates	Retention
Henchy (2011)	Self-Report	237	Undergraduates	Retention
Huesman, Brown, Lee, Kellogg & Radcliffe (2009)	Objective	5,211	Freshmen	Retention
Kampf & Teske (2013)	Objective	3,809	Freshmen	GPA, Retention
Lindsey & Sessoms (2006)	Self-Report	244	Undergraduates (Physical Education and Health Students)	Retention
Lindsey, Sessoms & Willis (2009)	Self-Report	161	Undergraduates (Health and Human Performance Students)	Retention
Mallinckrodt (1987)	Self-Report	207	Freshmen	Retention
McElveen & Rossow (2014)	Objective	589	Freshmen	GPA, Retention
Miller (2011)	Self-Report	453	Undergraduates	Retention

Table 2.1 (cont'd)

Todd, Czyszczon, Wallace Carr & Pratt (2009)	Objective	1,034	Undergraduates	GPA
Watson, Ayers, Zizzi & Naoi (2006)	Self-Report	665	Undergraduates and Graduate Students	GPA
Zizzi, Ayers, Watson & Keeler (2004)	Self-Report	655	Undergraduates	GPA

DISCUSSION

Although numerous benefits of physical activity are widely known, most young adults do not meet physical activity recommendations (ACHA, 2018). The college years can encompass much of this time for many individuals, and have been identified by previous research as a critical window for positive physical activity behavior development (Bray et al., 2011). On college campuses, a primary access point for physical activity is through recreational sports departments, which provide a variety of facilities and programming to support students' physical activity and wellness needs. In order to maintain the ability to meet these needs, funding is crucial. Recreational sports departments have been tasked with demonstrating their contributions to student success (Haines, 2001). The current body of literature supports a positive relationship between recreational sports participation and academic success. While some variables have been studied more than others, overall, these results are similar across various academic variables.

A major limitation to most of the research in this field is a reliance on survey methods for data collection, small sample sizes and a lack of control for other variables that can impact academic success. When considering other factors that can impact college student academic success, there are a multitude of variables outside of the classroom setting that may not always

be directly related to coursework. Relationships have been found for many variables including demographic characteristics, health behaviors, and university characteristics. Specific variables that have been found to have relationships with academic success include but are not limited to the following: age (Murtaugh, Burns, & Schuster, 1999; Upcraft, Gardener, & Barefoot, 2005); race/ethnicity; gender (DesJardins, Ahlburg, & McCall, 2002; Reason, 2009; Zheng, Saunders, Shelley, Mack, & Whalen, 2002); year in school (Reason, 2009); current residence (Nowack & Hanson, 1985); work hours per week for pay (Dundes & Marx, 2006); stress level (Pritchard & Wilson, 2003); diagnosed depression (Boynton Health Service, 2007); cigarette use (Boynton Health Service, 2007); substance use (Pritchard & Wilson, 2003; Wolaver, 2002); campus size (Lower, Turner, & Petersen, 2015); university type (public/private) (Lower et al., 2015); high school GPA (Astin, 1975; Murtaugh et al., 1999); American College Testing (ACT) and Scholastic Aptitude Test (SAT) scores (Astin, 1975; Upcraft et al., 2005); and socioeconomic status (SES) (Tinto, 2006; Upcraft et al., 2005). Research indicates that race, gender, SES, and high school GPA appear to be the most reliable predictors (Renn & Reason, 2013). Some studies have attempted to address these limitations, but more research is needed to establish stronger support for presence of relationships.

Research addressing some or all of these limitations would be very valuable in strengthening the argument that recreational sports participation plays an important role in college student academic success, and would provide further support for additional funding. Practitioners need to gather more data that provides generalizable samples, and use strong, consistent methodology with appropriate control for confounding variables. With a stronger argument for contributions to student academic success, recreational sports departments can better serve students through programming to promote physical activity on college campuses.

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CHAPTER THREE:

MANUSCRIPT ONE

Chapter three addresses specific aim one and the manuscript titled, *Club and Intramural Sports Participation and College Student Academic Success.* This manuscript was published on April 3, 2019.

Vasold, K.L., Deere, S.J., & Pivarnik, J.M. (2019). The relationship between club and intramural sports participation and academic success. *Recreational Sports Journal*. https://doi.org/10.1177/1558866119840085

Specific Aim 1: To determine the relationships between club and intramural sports participation and self-reported grade average in college students using American College Health Association National College Health Assessment data.

H 1.1. Club sports participants will self-report higher grade averages than non-participants.

H 1.2. Intramural sports participants will self-report higher grade averages than non-participants.

H 1.3. Students participating in both club and intramural sports will self-report higher grade averages than non-participants.

ABSTRACT

The purpose of this investigation was to determine the relationship between university club and intramural sports participation and student grades via the American College Health Association (ACHA) National College Health Assessment (NCHA) survey, while controlling for confounding variables. Data were obtained from the NCHA for the Fall 2008, Spring 2009, Fall 2009, and Fall 2010 time periods. The original sample included 178,091 respondents. After inclusion and exclusion criteria, the final analytic sample included 85,316 respondents. Multinomial logistic regression was used to evaluate the role of participation in club and/or intramural sports on self-reported grade averages. Analyses were adjusted for significant covariates that have been identified as potentially impacting academic success. In general, sport participants were more likely to report higher grade averages than non-participants. The strongest relationships were found for club sport participants. Future researchers should investigate relationships between club and intramural sports and other indicators of academic success.

INTRODUCTION

Physical activity has been found to have numerous benefits for both physical and mental health. Being physically active can decrease the risk of many chronic diseases such as cardiovascular disease, type II diabetes, stroke, various cancers, and even reduce the risk of premature death (Blair & Morris, 2009; Haskell et al., 2009; Reiner et al., 2013). Physical activity (PA) has also been found to improve mental health indicators. For instance, PA has been shown to reduce anxiety and stress, improve mood and self-esteem, and increase cognitive functioning (DiLorenzo et al., 1999; Etnier et al., 1997; Harvey et al., 2010). Unfortunately,

research has also shown that as age increases, physical activity levels decline (Sallis, 2000). These declines occur most rapidly when individuals transition from late adolescence to early adulthood, which for many encompasses the college years (Kwan et al., 2012; Zick et al., 2007; Douglas et al., 1997). However, for some, early adulthood can be used to establish physical activity patterns that will lead to health benefits later in life (United States Department of Health and Human Services [USDHHS], 2000). Moreover, research has shown that physical activity levels during college can have an impact on physical activity levels later in life (Sparling & Snow, 2002; Forrester et al., 2007). With the college years presenting an important transition from late adolescence to adulthood, support for the promotion of physical activity on college and university campuses has grown (Leslie et al., 2001).

There are various avenues for physical activity on college campuses, but one avenue that is easily accessible for most students is through services and facilities provided by recreational sports departments (Cooper & Theriault, 2008). Recreational sports departments provide a variety of options for physical activity including intramural and club sports, group fitness classes, fitness facility access, and open recreation areas (e.g., basketball courts, volleyball courts, swimming pools, etc.). Although campus administrators view health and physical activity as important, they may see these as secondary to student academic success; therefore, recreational sports departments are under pressure to justify the need for their services and obtain funding to support opportunities to benefit students (Haines, 2001).

Student academic success is commonly defined by grade point average (GPA), persistence, and retention (Seidman, 2005). Although academic success is often times defined by these variables, Astin's Theory of Involvement found it also depends on the connection and involvement that a student makes with his or her university (Astin, 1999). This theory centers

around 5 basic postulates: 1) involvement in the investment of physical and psychological energy in objects; 2) involvement occurs along a continuum; 3) involvement is both quantitative and qualitative; 4) student learning and professional development is directly proportional to involvement quantity and quality; and 5) effectiveness of educational policy and practice is directly related to the capacity for student involvement (Astin, 1999). Recreational sports is one example of an extra-curricular activity available to students on college campuses. Furthermore, recreational sports fits into this theory as it aligns with most of the postulates that Astin presents: recreational sports participation is both a physical and psychological investment of energy (postulate 1); participation can occur at different levels on a continuous scale and it can be measured for level of involvement in most cases (postulate 2); and we can quantify participation as well ask students to provide qualitative insight into the benefits of participation (postulate 3). Many university recreation departments have missions focused on health-related benefits, improvements in quality of life, and personal development for students (Ellis, Compton, Tyson, & Bohlig, 2002). Current investigations have focused on the contributions of recreational sports services to students learning experiences.

Various investigators have studied the relationship between academic success and campus wide recreational sports participation, including fitness center use, and club and intramural sports participation as a whole. Results have shown a small but positive relationship between recreational sports participation and several student success indicators including retention (Belch et al., 2001; Danbert et al., 2014; Forrester, 2015; Henchy, 2011; Huesman et al., 2009; Kampf & Teske, 2013; McElveen & Rossow, 2014; Windschitl, 2008), GPA (Belch et al., 2001; Danbert et al., 2014; Huesman et al., 2009; Kampf & Teske, 2013; McElveen & Rossow, 2014; Windschitl, 2008), credits completed (Belch et al., 2001; Danbert et al., 2014;

Windschitl, 2008), class standing (Danbert et al., 2014), graduation rates (Huesman et al., 2009), and various social factors such as sense of belonging (Henchy, 2011; Miller, 2011). Although results are positive, many studies focus on recreational sports participation in general, and more specific avenues of recreational sports participation have yet to be thoroughly investigated.

In particular, there is a gap in the literature concerning the relationship between club and intramural sports participation and college student academic success. Kampf and Teske (2013) investigated club sport participation and retention and found that even after controlling for other variables that can impact retention, such as high school GPA, students who participated in club sports were more than twice as likely to enroll at the university the following year than non-participants. McElveen and Rossow (2014) examined the relationship of intramural sports participation and academic indicators in first year students. The investigators found no significant differences in GPAs between students participating in intramural sports at frequencies of either moderate or high level participation, compared to non-participants. However, they did find an almost six percent higher retention rate in students who played intramural sports compared to those who did not (McElveen & Rossow, 2014). While these studies found some positive relationships among club and intramural sports participation and academic success, only one group controlled for confounding variables (Kampf & Teske, 2013), and both assessed only one institution. With few studies addressing the relationship between club and intramural sports participation and academic indicators, more research is needed on larger, nationally representative samples with more control of potential confounding variables. In a time of scrutiny when it comes to budgets (Kampf & Teske, 2013), limited generalizability of current literature can generate difficulties for recreational sports departments when providing justification for expenses of facilities and services.

The purpose of this investigation was to determine the relationship between university club and intramural sports participation and student grades via the American College Health Association (ACHA) National College Health Assessment (NCHA) survey, while controlling for confounding variables. It was hypothesized that students reporting participation in club and/or intramural sports would report higher grades than students who do not participate in either.

METHODS

Survey

Data used for this study were collected through the ACHA/NCHA during the Fall 2008, Fall 2009, Spring 2009, and Fall 2010 semesters. Spring 2010 data were not available to us. This survey began as the NCHA-I in the Spring of 2000, and was updated to the NCHA-II in Fall of 2008. There are six primary components to this survey, which include: 1) health, health education, and safety; 2) alcohol, tobacco, and other drug use; 3) sexual health; 4) mental and physical health; 5) impediments to academic performance; and 6) demographic characteristics (American College Health Association [ACHA], 2017). In total, 219 different institutions ranging from community colleges to research institutions with student bodies from 2,500 to more than 20,000 students participated during this time frame.

Study Participants

Study participants were anonymous responders (N=178,091) to the NCHA during the semesters specified above. Approval from the Institutional Review Board (IRB) was not necessary since the data were de-identified, and thus not considered to be human subjects' research. Exclusion criteria included students reporting: 1) collegiate varsity level sport participation; 2) an age outside of the normal college age range of 18 to 24 years old (Institute of

Education Sciences, 2016); 3) self-report of a disease or disorder that could impact academics or ability to participate in sport or physical activity such as ADHD (DuPaul, Weyandt, O'Dell, & Varejao, 2009), chronic illness (e.g., cancer, diabetes, auto-immune disorders) (Davis, 2012), deaf/hard of hearing (National Council on Disability [NCD], 2003), learning disability (Cortiella & Horowitz, 2014), mobility/dexterity disability (NCD, 2003), partially sighted/blind (Scott, 2009), or speech or language disorder (NCD, 2003); or 4) missing data for variables of interest. Inclusion criteria included being a full time, undergraduate student with a body mass index greater than or equal to 12 kg/m^2. The final analytic sample after exclusion and inclusion criteria included 85,316 respondents.

Exposure Variable

The exposure variable was sport participation, which was assessed via the following question, "Within the last 12 months, have you participated in organized college athletics at any of the following levels? Varsity, Club Sports, Intramurals." Participants responded with a "Yes" or "No" answer to each level of sport. Two variables of interest were developed from this question: 1) sport participation in general (participant or non-participant in club or intramural sports), and 2) sport participation stratified by sport type (club sports, intramural sports, or both sports). These variables were compared to the reference group of non-participants.

Outcome Variable

The outcome variable of academic success was self-reported grade average assessed via the following question, "What is your approximate cumulative grade average? A, B, C, D/F, or N/A." Because they represented a very small percentage of respondents, those reporting "D/F" (0.6%) or "N/A" (3.2%) were removed for statistical purposes.

Covariates

Several covariates were also assessed due to their impact on academic success variables: semester the survey was completed, race (DesJardins et al., 2002; Reason, 2009; Zheng et al., 2002), gender (DesJardins et al., 2002; Reason, 2009; Zheng et al., 2002), year in school (Reason, 2009), current residence (Nowack & Hanson, 1985), work hours per week for pay (Dundes & Marx, 2006), stress level (Pritchard & Wilson, 2003), diagnosed depression (Boynton Health Service, 2007), cigarette use (Boynton Health Service, 2007), and substance use (alcohol and/or marijuana) (Pritchard & Wilson, 2003; Wolaver, 2002), campus size (Lower, Turner & Petersen, 2015), and university type (public/private) (Lower et al, 2015).

The majority of covariates were re-categorized by combining response categories of the questions for statistical purposes. Race was analyzed as "white" and "non-white." Gender included "male" or "female"; there was a small response rate (0.1%) of "transgendered" who were not analyzed. Current residence was dichotomized into "campus residence hall" or "other." Work hours per week for pay was analyzed as "<20 hours" or "≥20 hours." Stress level was categorized as "none/less than average," "average," and "more than average/tremendous." Diagnosed depression, cigarette use, and substance use variables were restructured and evaluated as "yes" or "no" variables.

Statistical Analyses

Statistical analyses included the calculation of percentages for all variables of interest. Multinomial logistic regression was used to evaluate the role of participation in club or intramural sports on the likelihood that a student would report an "A" versus a "C" grade average or a "B" versus a "C" grade average. Those reporting a "C" grade average were used as the referent group. Those reporting no participation in any sport category (non-participants) were

also used as a referent group when comparisons were made between participants and non-participants. Sport participation variables were evaluated in both unadjusted and adjusted models, first as a dichotomous variable of participant versus non-participant, and then as a variable stratified by category of sport participation (club sports, intramural sports, both sports) versus non-participants. Chi-square analysis was used to identify significant variables for adjusted models. All analyses were conducted in SPSS 23.0 statistical software. An alpha level of $p < .05$ was used to indicate statistical significance. Statistical assumptions for all analyses were met.

RESULTS

The analytic sample (n=85,316) had an average age of 19.9±1.5 years, BMI of 23.7±4.7 kg/m^2, was primarily white (74.5%) and female (67.7%). Twenty-eight percent of respondents reported participating in either club or intramural sports. When sport participation was further analyzed, the majority of these respondents participated in intramural sports (17%), followed by club sports (6.2%), and both sports categories (4.8%). All covariates assessed were significantly related to self-reported grade average ($p < .05$). Respondents participating in the survey in Fall 2008 reported higher grade averages than respondents participating in Fall 2009, Fall 2010, and Spring 2009, X^2 (6, N = 85,316) = 147.57, $p < .001$, $V = .03$. Furthermore, the following characteristics were associated with reporting higher grade averages: being female, X^2 (2, N = 85,316) = 208.11, $p < .001$, $V = .05$; non-Hispanic white, X^2 (2, N = 85,316) = 1,807.72, $p < .001$, $V = .15$; living on campus, X^2 (2, N = 85,316) = 618.197 $p < .001$, $V = .09$; no prior cigarette use, X^2 (2, N = 85,316) = 921.12, $p < .001$, $V = .10$; no prior substance use, X^2 (2, N = 85,316) = 451.46, $p < .001$, $V = .07$; never having been diagnosed with depression, X^2 (2, N = 85,316) =

30.77, $p < .001$, $V = .02$; reporting no/less than average stress, X^2 (4, $N = 85{,}316$) = 127.68, $p < .001$, $V = .03$; being an upperclassman, X^2 (6, $N = 85{,}316$) = 97.27, $p < .001$, $V = .02$; working less than 20 hours per week, X^2 (2, $N = 85{,}316$) = 596.49, $p < .001$, $V = .08$; attending a private campus/university, X^2 (2, $N = 85{,}316$) = 1779.39, $p < .001$, $V = .14$, and attending a smaller university/campus, X^2 (8, $N = 85{,}316$) = 399.99, $p < .001$, $V = .05$. Tables 3.1 and 3.2 depict covariate variables and sport participation by self-reported grade average. Table 3.3 depicts covariate variables by sport participation.

As seen in table 3.4, respondents who reported any sport participation (either club and/or intramural sports) were 18 percent more likely to report an A versus a C average, *OR* = 1.18, 95% CI [1.12, 1.24], and 16 percent more likely to report a B versus a C average than non-participants, *OR* = 1.16, 95% CI [1.11, 1.22]. After adjusting for significant covariates (race, gender, year in school, current residence, work hours per week for pay, stress level, diagnosed depression, cigarette use, substance use, university type (public/private), and campus size), participants of club or intramural sports were 8 percent more likely to report a B versus C average than non-participants, *aOR* = 1.08, 95% CI [1.03, 1.14]. Odds ratios were no longer significant for A versus C average comparisons as the 95% confidence intervals included 1.0.

Results for sport participation by sport category can be found in table 3.5. When stratifying participants by category of sport participation (club sports, intramural sports, both sports), club sports participants were 35 percent more likely to report an A versus C average, *OR* = 1.35, 95% CI [1.23, 1.50], and 25 percent more likely to report a B versus C average than non-participants, *OR* = 1.25, 95% CI [1.14, 1.38].

Intramural sports participants were 12 percent more likely to report an A versus C average, *OR* = 1.12, 95% CI [1.05, 1.19], and 11 percent more likely to report a B versus C

average than non-participants, *OR* = 1.11, 95% CI [1.05, 1.18]. Participants of both club and intramural sports were 17 percent more likely to report an A versus C average, *OR* = 1.17, 95% CI [1.05, 1.31], and 24 percent more likely to report a B versus a C average than non-participants, *OR* = 1.24, 95% CI [1.12, 1.38].

After adjusting for all covariates, club sports participants were 14 percent more likely to report an A versus C average, *aOR* = 1.14, 95% CI [1.03, 1.26], and 14 percent more likely to report a B versus C average than non-participants, *aOR* = 1.14, 95% CI [1.03, 1.25]. Participants of both sports were 14 percent more likely to report a B average versus C average than non-participants, *aOR* = 1.14, 95% CI [1.02, 1.27]. Odds ratios were no longer significant for intramural sports participants for either A or B average versus C average comparisons, and participants of both sports for A versus C comparisons as the 95% confidence intervals included 1.0.

Table 3.1

Demographic variables by self-reported grade average

Variable	Total	A	B	C
n	85,316	31,354	43,805	10,157
Gender (%)*				
Female	67.7	69.8	67.4	62.2
Male	32.3	30.2	32.6	37.8
Race (%)*				
White	74.5	81.2	72.8	60.9
Other	25.5	18.8	27.2	39.1
Current Residence (%)*				
Campus Residence Hall	47.0	51.9	45.2	39.0
Other	53.0	48.1	54.8	61.0
Cigarette Use (%)*				
Never used	69.6	75.6	67.1	62.1
Used at least once	30.4	24.4	32.9	37.9
Substance Use (%)*				
Never Used	22.7	26.7	20.7	19.2
Used at least once	77.3	73.3	79.3	80.8
Diagnosed Depression (%)*				
Yes	13.6	13.0	13.6	15.2
Stress Level (%)*				
None/Less than average	10.0	10.2	9.9	9.7
Average	42.2	42.5	43.0	37.4
More than average/Tremendous	47.8	47.3	47.1	52.9
Year In School (%)*				
1st year undergraduate	30.5	31.9	30.2	27.2
2nd year undergraduate	23.5	23.0	23.4	25.9
3rd year undergraduate	23.6	22.9	23.9	24.1
4th/5th year undergraduate	22.4	22.2	22.5	22.8
Hours per week working for pay(%)*				
<20 hours	85.9	89.1	84.9	80.0
≥20 hours	14.1	10.9	15.1	20.0
Semester (%)*				
Fall 2008	14.5	15.6	14.5	11.1
Spring 2009	49.9	49.8	49.3	52.3
Fall 2009	18.5	17.6	19.1	19.1
Fall 2010	17.2	17.0	17.1	17.6
University Type (%)*				
Public	65.4	58.2	67.1	80.4
Private	34.6	41.8	32.9	19.6

Table 3.1 (cont'd)

Campus Size (%)*				
Less than 2,500	8.1	9.7	7.7	5.2
2,500 - 4,999	10.5	10.9	10.5	9.1
5,000 - 9,999	23.1	23.9	23.2	20.4
10,000 - 19,999	21.7	20.5	22.0	23.7
20,000 or more	36.6	35.1	36.5	41.6

Note. Race category 'Other' includes, 'Black (non-Hispanic)', 'Hispanic or Latino', 'Asian or Pacific Islander', 'American Indian, Alaskan Native, Native Hawaiian', 'Biracial or Multiracial', and 'other'. Substance use includes alcohol and/or marijuana use.

* Global statistical difference among grade average at $p<0.05$.

Table 3.2

Sport participation by self-reported grade average

Variable	**Total**	**A**	**B**	**C**
n	85,316	31,354	43,805	10,157
Participant (%)	28.1	28.6	28.3	25.4
Non-Participant (%)	71.9	71.4	71.7	74.6
Club Sports (%)	6.2	6.6	6.1	5.1
Intramural Sports (%)	17.0	17.2	17.1	16.0
Both (%)	4.8	4.7	5.0	4.2
Non-Participant (%)	71.9	71.4	71.7	74.6

Table 3.3

Demographic variables by sport participation

Variable	Total	Participant	Non-Participant
n	85,316	23,941	61,375
Gender (%)*			
Female	67.7	52.3	73.7
Male	32.3	47.7	26.3
Race (%)*			
White	74.5	81.1	71.9
Other	25.5	18.9	28.1
Current Residence (%)*			
Campus Residence Hall	47.0	52.8	44.7
Other	53.0	47.2	55.3
Cigarette Use (%)*			
Never used	69.6	69.8	69.6
Used at least once	30.4	30.2	30.4
Substance Use (%)*			
Never Used	22.7	17.6	24.7
Used at least once	77.3	82.4	75.3
Diagnosed Depression (%)*			
Yes	13.6	10.4	14.9
Stress Level (%)*			
None/Less than average	10.0	13.0	8.8
Average	42.2	44.3	41.3
More than average/Tremendous	47.8	42.7	49.8
Year In School (%)*			
1st year undergraduate	30.5	29.8	30.8
2nd year undergraduate	23.5	25.7	22.7
3rd year undergraduate	23.6	23.6	23.6
4th/5th year undergraduate	22.4	21.0	22.9
Hours per week working for pay(%)*			
<20 hours	85.9	90.0	84.3
≥20 hours	14.1	10.0	15.7
Semester (%)*			
Fall 2008	14.5	13.9	14.7
Spring 2009	49.9	51.2	49.3
Fall 2009	18.5	18.7	18.4
Fall 2010	17.2	16.2	17.5
University Type (%)*			
Public	65.4	62.5	66.6
Private	34.6	37.5	33.4

Table 3.3 (cont'd)

Campus Size (%)*			
Less than 2,500	8.1	8.2	8.1
2,500 - 4,999	10.5	10.2	10.6
5,000 - 9,999	23.1	24.6	22.5
10,000 - 19,999	21.7	22.5	21.3
20,000 or more	36.6	34.4	37.4

Note. Race category 'Other' includes, 'Black (non-Hispanic)', 'Hispanic or Latino', 'Asian or Pacific Islander', 'American Indian, Alaskan Native, Native Hawaiian', 'Biracial or Multiracial', and 'other'. Substance use includes alcohol and/or marijuana use.

Table 3.4

Odds ratios for self-reported grade average by sport participation

	A vs. C		**B vs. C**	
Variable	OR [95% CI]	aOR[a] [95% CI]	OR [95% CI]	aOR[a] [95% CI]
Participant	1.18* [1.12-1.24]	1.04 [0.99-1.10]	1.16* [1.11-1.22]	1.08* [1.03-1.14]
Non-Participant	1	1	1	1

[a] Adjusted model includes: race, gender, year in school, current residence, work hours per week for pay, stress level, diagnosed depression, cigarette use, substance use (alcohol and/or marijuana), public/private classification, and campus size

*Statistically significant by 95% CI

Table 3.5

Odds ratios for self-reported grade average by sport participation by sport category

	A vs. C		B vs. C	
Variable	OR [95% CI]	aOR[a] [95% CI]	OR [95% CI]	aOR[a] [95% CI]
Club Sports	1.35* [1.23-1.50]	1.14* [1.03-1.26]	1.25* [1.14-1.38]	1.14* [1.03-1.25]
Intramural Sports	1.12* [1.05-1.19]	1.02 [0.95-1.09]	1.11* [1.05-1.18]	1.05 [0.99-1.12]
Both	1.17* [1.05-1.31]	1.02 [0.91-1.15]	1.24* [1.12-1.38]	1.14* [1.02-1.27]
Non-Participant	1	1	1	1

[a] Adjusted model includes: race, gender, year in school, current residence, work hours per week for pay, stress level, diagnosed depression, cigarette use, substance use (alcohol and/or marijuana), public/private classification, and campus size

*Statistically significant by 95% CI

DISCUSSION

The purpose of this study was to determine the relationship between university club and intramural sports participation and student grades via the ACHA/NCHA survey, while controlling for confounding variables. Overall, results of this study support the proposed hypothesis that students reporting participation in club and/or intramural sports report higher grade averages than students who do not.

Overall, results were mostly positive, with significant findings even after adjusting for covariates. When evaluating participation versus non-participation, participants were more likely to report higher grade averages than non-participants. Additionally, when stratifying by sport type (i.e., club sports, intramural sports, or both sports), club sports participants were also more

likely to report higher grade averages than non-participants. With the current gap in the literature concerning the relationships between academic success and club and intramural sports participation, it is difficult to make comparisons to other studies. Kampf and Teske investigated club sports participation, and found positive relationships for retention but did not assess grade averages (Kampf & Teske, 2013). McElveen and Rossow investigated intramural sports participation, and similarly found no relationship between participation and GPA, but did not account for covariates (McElveen & Rossow, 2014). Neither study used a sample that included students from more than one university. Therefore, results from the present investigation are needed to evaluate the relationships between club and intramural sports participation that include different variables of academic success, consider covariates, and include a more nationally representative sample.

The strongest relationships were found in participants of club sports, followed by those individuals reporting participation in both club and intramurals sports. Previous research suggests some reasons as to why this might occur including the following: being on a more consistent and cohesive team, the added responsibility and leadership skills needed, required minimum grade point averages, need for greater time management skills, a higher level of competition, more vigorous physical activity, and the role of coaches in club sports (L. M. Lower, Turner, & Petersen, 2013). Another consideration would be the role of socioeconomic status as a variable that can impact both club sport participation and student academic success. Club sport participation has the potential to be significantly higher cost to participants than other avenues of recreational sport depending on the characteristics of the team (i.e., if a coach is hired, travel costs, etc.). Students who can afford this higher cost may have higher socioeconomic status, which has been associated with more favorable academic outcomes

(Tinto, 2006). Each, or some combination of these variables could be driving factors behind the stronger relationships between club sports participation and self-reported grade averages in this study, and future research should investigate the role that these factors play in the relationship between club sport participation and academic success in college students.

As with all research investigations, there are strengths and limitations to the present study. A large sample size and the use of a national dataset to investigate the research questions are a strength of this study. Few studies have evaluated national datasets in general, or have comparable sample sizes, and this provides more generalizability of the results. An additional strength of this study is the adjustment of analyses for various covariates that could also impact academic success. Student academic success is an intricate web with many different impactors. By adjusting for variables that have been shown to impact academic success, the authors of this study were able to provide a stronger argument for the positive relationships between club and intramural sports participation and self-reported grade average.

Although this study addressed some of the limitations of previous research, there are still others, including the cross-sectional nature of the study. The data in this study span multiple years, but individual responses were not tracked to assess the longitudinal impact of club and intramural sports participation on self-reported grade average. In addition, all data were self-reported and can be subject to recall bias, and researchers were limited by the wording of the survey questions. With GPA responses being limited to letter grades without including + or - levels, misclassification bias could have also occurred with some individuals. While we were unable to analyze the very low (D/F) and unavailable (N/A) grades, their removal did not likely influence the overall study findings because there were so few of them. Other limitations were also present statistically with differences in group sizes (i.e., small cell sizes) between

participants and non-participants and the potential for different random sampling methods at each university. Additionally, variables such as frequency and or longevity of participation in club and intramural sports were not evaluated due to the dichotomous nature of the questions. Finally, there are limitations to the ACHA-NCHA data itself, including different random sampling methods. Future research should work to address these limitations through longitudinal studies that also evaluate differences in frequency of participation.

Conclusion

College is a time of great importance for the development of positive future health behaviors in young adults. Previous research has shown that these positive health behaviors, such as participation in physical activity through avenues such as recreational sports, can also have an impact on academic success. Results of this study support the findings of previous research and demonstrate a positive relationship between participation and self-reported grade averages, in particular for club sports participants. Future research should continue to investigate national level datasets for these relationships and adjust for covariates that could also impact academic success. With almost 30 percent of students reporting participation in either club and/or intramural sports, recreational sports professionals can utilize information from this study to support the need for club and intramural sports opportunities when addressing higher administration. Professionals should also consider the variety of variables that can impact student academic success and design programming and services evaluations to include these variables if possible.

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CHAPTER FOUR:

MANUSCRIPT TWO

Chapter four addresses specific aim two and the manuscript titled, *Academic Success and One-Year of Intramural Sports Participation by Freshmen Students*. This manuscript was published on February 25, 2019.

Vasold, K.L., Kosowski, L.E., & Pivarnik, J.M. (2019). Academic success and one-year of intramural sports participation by freshmen students. *Journal of College Student Retention: Research, Theory & Practice*. https://doi.org/10.1177/1521025119833000

Specific Aim 2: To evaluate the relationships between intramural sports participation and academic success indicators (grade point average, credit difference, 1-year retention, and achievement of sophomore status) in university freshmen following their first year.

H 2.1. Intramural sports participants will have higher grade point averages at the end of their first year than non-participants.

H 2.2. Intramural sports participants will have lower credit differences at the end of their first year than non-participants.

H 2.3. Intramural sports participants will be more likely to be retained at the one-year mark than non-participants.

H 2.4. Intramural sports participants will be more likely to achieve sophomore status following their first year than non-participants.

ABSTRACT

The purpose of this study was to investigate differences in academic indicators among intramural sports participants and non-participants following their first year of college. Matched samples (N=1,796; 898 pairs) were generated based on demographic variables. Data were obtained from university databases. Paired sample t-tests and logistic regression were used to assess differences between participants and non-participants. First semester and first year GPA were significantly higher (p-value<0.001) for participants than non-participants. First semester and first year credit difference were significantly lower (p-value<0.001) for intramural sports participants than non-participants. Participants were more than twice as likely to be retained than non-participants, and 40 percent more likely to achieve sophomore status. Results suggest that freshmen students participating in intramural sports during their first year of college achieve greater academic success than non-participants.

INTRODUCTION

University administrators continually focus on student academic success, but not all learning takes place within the classroom on college campuses. Student affairs departments provide various programs and events for engagement and learning outside coursework, and these contributions are important for the development and success of students as a whole (Sandeen, 2004). One avenue of engagement that most universities provide are opportunities through recreational sports departments, and many choose to participate in intramural sports. With numerous options including team and individual activities, approximately 16.5 percent of students report participation in intramural sports (American College Health Association [ACHA], 2017)

Within divisions of education and student affairs, there are many models to predict academic success, however, Astin's Theory of Student Involvement and Tinto's Model of Student Departure are most applicable within the context of recreational and intramural sports. Astin found that factors within the college environment that promote involvement were associated with student persistence, with one example being extra-curricular activity participation (Astin, 1975). Intramural sports is one example of an extra-curricular activity designed for students. Tinto's Theory of Student Departure also centers on the student's level of involvement with his or her university and the connection made to campus (Tinto, 1999, 2006). For many, this connection is made within the first year of attendance, and Tinto's theory dictates that the first year of college is extremely important for future academic success (Tinto, 1999, 2006). Tinto's theory supports the process of developing those habits within a contextual model of student involvement at a university, which can result in academic success because of integration into the campus community through intramural sports participation.

The recreational sports literature concerning student academic success have found some small, positive results, but as a whole is limited by few studies which have included control for potential confounders. When considering other factors that can impact college student academic success there are a multitude of variables outside of the classroom setting that may not be thought to affect coursework. Relationships have been found for many factors including demographic characteristics, health behaviors, and university characteristics, but research indicates that race, gender, socioeconomic status, and high school GPA appear to be the most reliable predictors (Renn & Reason, 2013). Research concerning intramural sports participation and academic indicators of student success is minimal. Only one study was identified that examined relationships between intramural sports and indicators of academic success (McElveen

& Rossow, 2014). McElveen and Rossow (2014) assessed intramural sports participation and first semester and first year grade point average (GPA) and retention rates in freshmen students. The sample (N=589) included only first-time in college freshmen from the Fall 2010 semester, and assessed differences between non-participants, students with moderate participation (1 to 3 sports per semester), and students with high participation (4 or more sports per semester). Usage and academic variables were collected from university databases. Results revealed no significant differences for GPA between participants at any frequency and non-participants of intramural sports at either the first-semester [$F(2, 586) = 1.669$, $p=0.189$] or first-year time points [$F(2, 557)=0.102$, $p=0.903$]. However, significant differences were found for retention. At each time point, intramural sports participants had higher retention rates than non-participants: fall to spring (96.5% versus 91.8%), spring to fall (82.7% versus 80.5%), and fall to fall (79.8% versus 73.9%). Strengths of this study include the assessment of an individual avenue of recreational sports participation, investigation of frequency of use, and utilization of university databases for variables of interest. However, adjustment for potentially confounding variables was not conducted. Other studies have assessed intramural sports as a part of total on-campus student involvement in all opportunities offered by student affairs (Gibbison, Henry, & Perkins-Brown, 2011), or investigated outcomes of sense of community/belonging (Phipps, Cooper, Shores, Williams, & Mize, 2015; Sturts & Ross, 2013), time management (Sturts & Ross, 2013), self-confidence (Sturts & Ross, 2013), or physical health indicators (Simmons & Childers, 2013).

The purpose of this study was to investigate differences in GPA, credit difference (CD; credits attempted-credits completed), retention, and achievement of sophomore status between intramural sports participants and non-participants following their first year of college while accounting for potential confounding variables. It was hypothesized that participants of

intramural sports would achieve higher GPAs, lower CD, be more likely to be retained, and more likely to achieve sophomore status following their first year.

METHODS

Data were obtained through university databases at a large Midwestern public university. Participants included first time freshmen students living on campus, and were from the fall 2013 and fall 2014 cohorts (n=13,652). Intramural sports data were obtained from the university recreation center IMLeagues database, a popular database management tool utilized by recreational sports departments on college campuses. Individuals were identified as 'participants' if they had played in at least 1 intramural game each semester of their first year (n=970; 7.1%). A matched sample of participants and non-participants was generated using the FUZZY matching, which is a Python extension command in SPSS Statistics (*SPSS*, 2017).

The sample was matched on variables that have shown to impact academic success including age, race, gender, Pell grant eligibility, first generation status, and high school GPA. Students were also matched based on their cohort. All variables were matched exactly, with the exception of high school GPA, which was matched within 0.25 GPA points. This slight variability was used to allow for a maximum number of matches to be generated within the sample. This process resulted in a final analytic sample of 1,796 students (898 matched pairs). Matching of study participants is a valid method used within epidemiological cohort studies (Costanza, 1995; de Graaf, Jager, Zoccali, & Dekker, 2011), and this method was adapted for effective use with the current dataset.

Academic Variables

Academic variables were obtained from the university registrar and evaluated at the first semester and first year time points for GPA and credit difference (CD). Credit difference is the credits attempted by the student minus the credits completed by the student, therefore, a lower CD value indicates greater academic success for the student (i.e., fewer course credits dropped or failed). Retention and achievement of sophomore status were also evaluated at the one-year time point. Students were considered to have been retained at the one-year mark if they were enrolled in the fall semester following their first year. Students were considered having achieved sophomore status by university standards if they completed 28 or more credits prior to the fall semester following their first year.

Statistical Analyses

Means, standard deviations and percentages were calculated for all variables of interest. Paired sample t-tests were used to evaluate differences in GPA and CD between participants and non-participants of intramural sports. Logistic regression was used to evaluate the role of intramural sports participation on the odds of being retained and achieving sophomore status following the first year of college. Adjusted comparisons were not necessary as the generation of the matched sample allowed for control of confounding variables.

RESULTS

The final analytic sample (n=1,796, 898 pairs) had an average age of 19.5±0.6 years, was primarily Caucasian (87.2%), male (77.7%), and from the 2014 cohort (73.4%). Additionally, 4.6 percent of students were Pell grant eligible, 14.7 percent were first generation college

students, and the average high school GPAs for participants and non-participants were 3.71±0.31 and 3.70±0.30, respectively. See table 4.1 for demographic variables.

As shown in table 4.2 below, first semester cumulative GPA was significantly higher ($p<0.001$) for participants (3.25±0.66) than non-participants (3.09±0.80). Likewise, first year cumulative GPA ($p<0.001$) was also significantly higher for participants (3.25±0.63) than non-participants (3.07±0.78).

First semester cumulative CD was significantly lower ($p=0.001$) for intramural sports participants (5.53±7.00) than non-participants (6.63±7.72). In addition, first year cumulative CD ($p<0.001$) was also significantly lower for participants (6.09±7.13) than non-participants (7.70±8.20).

Results also indicate that intramural sport participants were 2.3 times more likely to be retained after their first year (OR: 2.32; 95%CI: 1.53-3.51) and 1.4 times more likely to achieve sophomore status following their first year (OR: 1.42; 95%CI: 1.11-1.82) than non-participants (table 4.3). Figure 4.1 presents a summary of the major results.

Table 4.1

Matched sample demographic characteristics

Variable	**Participants (n=898)**	**Non-Participants (n=898)**
Gender (%)		
Male	77.7%	77.7%
Female	22.3%	22.3%
Race (%)		
White	87.2%	87.2%
Other	12.8%	12.8%
Pell Grant Eligibility (%)		
Yes	4.6%	4.6%
No	95.4%	95.4%
First Generation Student Status (%)		
Yes	14.7%	14.7%
No	85.3%	85.3%
Cohort (%)		
2013	26.4%	26.4%
2014	73.4%	73.4%
High School GPA (Mean±SD)	3.70±0.31	3.70±0.30

Table 4.2

Means±SD for 1st semester and 1st year cumulative GPA and cumulative credit difference

	Mean±SD	
Variables	Participants (n=898)	Non-Participants (n=898)
1st Semester Cumulative GPA*	3.25±0.66	3.09±0.79
1st Year Cumulative GPA*	3.25±0.63	3.07±0.78
1st Semester Cumulative CD*	5.53±6.99	6.63±7.72
1st Year Cumulative CD*	6.09±7.13	7.70±8.20

*Statistically significant difference between participants and non-participants, $p<0.05$

CD = credit difference (credits attempted - credits completed)

Table 4.3

Odds ratios and 95% confidence intervals for one-year retention and achievement of sophomore status

	One-Year Retention	**Achievement of Sophomore Status**
Variable	OR [95% CI]	OR [95% CI]
Participant	2.32* [1.53-3.51]	1.42* [1.11-1.82]
Non-Participant	1	1

*Statistically significant based on 95% CI

OR = odds ratio; CI = confidence interval

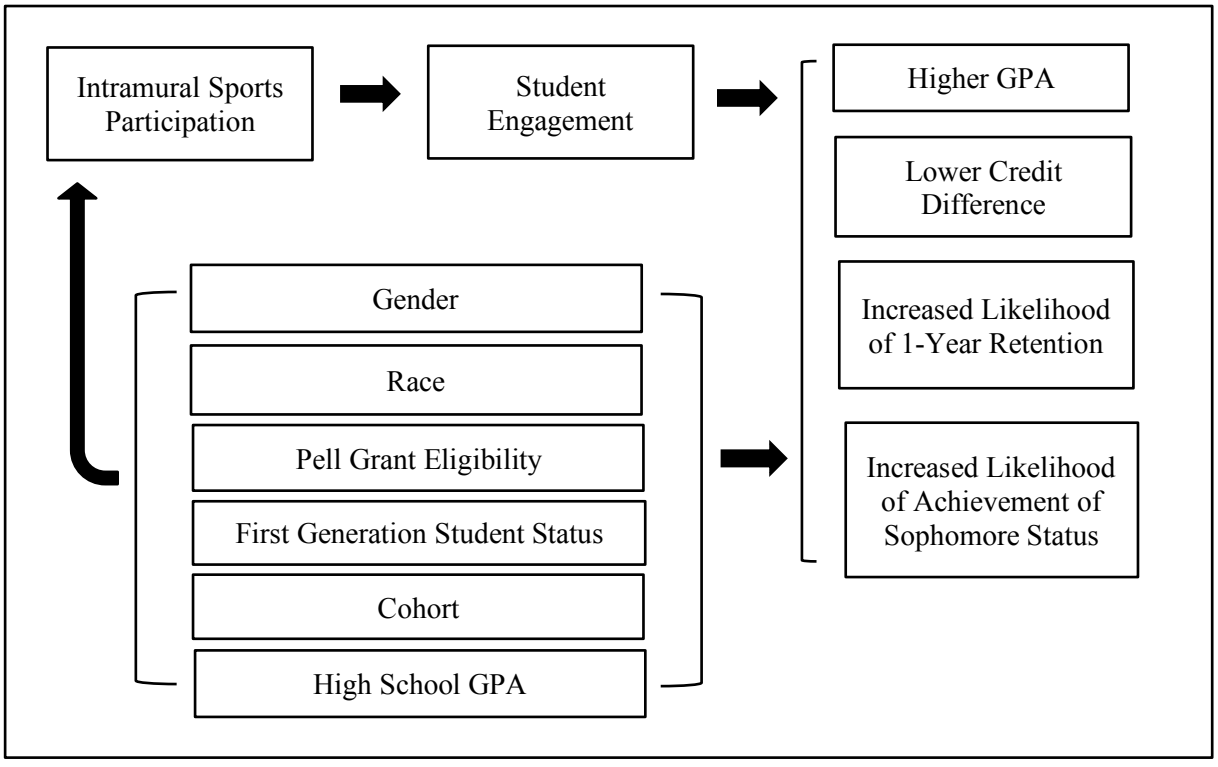

Figure 4.1

Summary of major results

DISCUSSION

The purpose of this study was to investigate differences in GPA, credit difference (CD), retention, and achievement of sophomore status between intramural sports participants and non-participants following their first year of college. It was hypothesized that participants of intramural sports would achieve higher GPAs, lower CD, be more likely to be retained, and more likely to achieve sophomore status following their first year, and the results of this study supported these hypotheses. Intramural sports participants achieved higher GPAs at the first semester and first year time points than non-participants. Participants also had lower CD (i.e., dropped or failed fewer credits) than non-participants, and were more likely to be retained and to achieve sophomore status following their first year than non-participants.

Theories of student success, such as Astin's Theory of Student Involvement and Tinto's Theory of Student Departure, support these findings. Astin's theory supports that student academic success is dependent on the connection and involvement a student has with his or her university (Astin, 1999). This theory centers around five basic postulates: 1) physical and psychological involvement/investment; 2) involvement is along a continuum; 3) involvement is quantitative and qualitative; 4) involvement quantity and quality is related to student learning and professional development; and 5) the capacity for student involvement is related to effectiveness of educational policy and practice (Astin, 1999). Intramural sports participation is both a physical and psychological investment of energy (postulate 1); participation can occur at different levels on a continuous scale and it can be measured for level of involvement (postulate 2); and we can quantify participation as well ask students to qualitatively give insight into the benefits of participation (postulate 3). Tinto's theory contains three stages for the integration of a student into the academic and social system of a university: separation, transition, and

incorporation (Tinto, 1999, 2006). As this process occurs, students separate from previous norms or beliefs that they had before entering the university community (Tinto, 1999). For some, sport and/or physical activity participation may have been a norm and will continue to be a norm, indicating a low level of separation. Transition occurs as students move from previous beliefs and norms to the new beliefs and norms they are incorporating into their life as a college student (Tinto, 1999). It is also possible that students will develop new beliefs concerning sport as intramural sports programs can offer more opportunities and perhaps a less formal environment for competition.

Previous research concerning intramural sports participation and academic success is very limited with only one study identified that assessed academic indicators quantitatively. McElveen and Rossow (2014) also investigated differences between intramural sports participants and non-participants in first year students. Their findings showed no differences in participant and non-participant GPAs, but a positive relationship for retention with intramural sports participants being more likely to be retained than non-participants (McElveen & Rossow, 2014). Results of the current study conflict with that of McElveen and Rossow's for GPA but agree with results for retention. A possible reason for this would be the lack of control for confounding variables in McElveen and Rossow's study.

Overall, there were many strengths to the design of this study, but there were also some important limitations to consider. Strengths included a moderately large sample size, the use of objective measures for both exposure and outcome variables, and the development of a matched dataset to control for potential confounding variables in relationships. Race, gender, socioeconomic status, and high school GPA are reliable predictors of student academic success (Renn & Reason, 2013). Therefore, we matched on all of these variables, plus the addition of

first generation college student status to further strengthen the methodology. Limitations include the cross-sectional nature of the study, limited presence of female, Pell grant eligible, and first generation students in the sample, and the fact that these data only encompass one institution. Additionally, frequency of participation was not assessed.

In conclusion, our results suggest that freshmen students participating in intramural sports during their first year of college achieve higher cumulative first semester and first year GPAs, have a lower first semester and first year cumulative CD, are more likely to be retained, and are more likely to achieve sophomore status following the first year than students who do not participate in intramural sports. With the limited data available in this area, the results of this study support the need for more research investigating relationships between intramural sports participation and academic success in college students. Theories of student success provide a framework that would explain possible associations between participation and greater student success through the variable of student involvement. The use of a matched dataset based on variables that are known to influence academic success was a first step in controlling for other variables that could lead to greater academic success. Future studies should investigate outcomes beyond the first year, whether or not frequency of participation plays a role in these relationships, and explore the role that other factors known to contribute to academic success play in these relationships.

There are many practical implications of this study for student affairs professionals including providing information on intramural sports opportunities at orientation programs for students. Additionally, given the low prevalence of female participants in intramural sports programs, promotional materials could be generated that are specific to female students as many universities offer co-ed and female only leagues.

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CHAPTER FIVE:

MANUSCRIPT THREE

Chapter five addresses specific aim three and this manuscript titled, *Recreational Sports Participation and Academic Success: Number of Activities and Time Investment*, is currently under review at the *Journal of Student Affairs Research and Practice.*

Specific Aim 3: To evaluate the relationships between recreational sports participation (numbers of activities and amount of time invested) and academic success indicators (self-reported anticipated semester GPA and self-reported likelihood of retention).

H 3.1. Students participating in greater numbers of activities will self-report higher anticipated semester GPAs than non-participants and students participating in fewer numbers of activities.

H 3.2. Students investing greater amounts of time will self-report higher anticipated semester GPAs than non-participants and students investing lower amounts of time.

H 3.3. Students participating in greater numbers of activities will be more likely to self-report remaining at their universities than non-participants and students participating in fewer numbers of activities.

H 3.4. Students investing greater amounts of time will be more likely to self-report remaining at their universities than non-participants and students investing lower amounts of time.

ABSTRACT

The purpose of this study was to investigate the relationship between student academic success and recreational sports participation defined as 1) user versus non-user, 2) number of activities, and 3) time invested. Data from five years of the NASPA Assessment and Knowledge Consortium Recreation and Wellness Benchmark (N=64,483) was utilized. Students participating in a moderate number of activities and a high time investment were more likely to self-report higher anticipated term GPAs than non-users. No significant relationships were found for likelihood of retention next term. Future research should review this topic further by investigating objectively collected (i.e. non-survey) data from multiple institutions.

INTRODUCTION

The college campus community has many resources designed to foster student engagement and success. Various programs and events are held to encourage learning and a connection with campus outside of the classroom, and these can promote success of students who participate (Sandeen, 2004). Less noticed are recreational sports departments who also work to support students through various avenues. Through inclusive and accessible activities, recreational sports departments make large contributions to campus by engaging of students. Indeed, their programming aligns with Astin (1975) and Tinto (1987) in terms of student involvement and engagement as keys to student success.

Recreational sports departments provide a variety of options for physical activity including intramural and club sports, group fitness classes, fitness facility access, and open recreation areas (e.g., basketball courts, volleyball courts, swimming pools, etc.). As with other departments within student affairs, to maintain funding to support student needs, recreational

sports departments have been tasked with examining the relationship between student academic success and participation in their services (Haines, 2001). Assessments are needed to provide rationale for the current existence, and future funding, of programming and facilities (Haines, 2001). Without funding, departments will not be able to support the needs of students and the campus community.

Student academic success is commonly defined by grade point average (GPA) and persistence/retention (Seidman, 2005). Previous research pertaining to recreational sports participation and academic success has found positive results for retention (Belch, Gebel, & Maas, 2001; Forrester, 2015; Huesman, Brown, Lee, Kellogg, & Radcliffe, 2009; Kampf & Teske, 2013; McElveen & Rossow, 2014) and GPA (Belch et al., 2001; Danbert, Pivarnik, McNeil, & Washington, 2014; Kampf & Teske, 2013).However, most of these studies are comprised of data collected from only one institution and lack statistical analyses that control for other factors that could impact academic success.

One recent study that investigated a multi-institutional dataset was conducted by Forrester (2015). This study evaluated a national sample of undergraduate students (N=33,522) from 38 different colleges and universities using the 2013 NASPA Assessment and Knowledge Consortium Recreation and Wellness Benchmark survey. This survey asks separate questions about the importance of facilities and programs in a student's decision to continue at their current university. Frequencies and Kruskal-Wallis analysis of variance were utilized to assess the importance of programs and facilities in retention while considering depth/frequency of participation and breadth/variety of participation in recreational sports opportunities. Sixty-seven percent of students indicated that recreational sports programming was important in their decision to continue at their current university, and significant results were found for depth

($p<0.001$) and breadth of participation ($p<0.001$). Students who participated more frequently, and in more activities, indicated a greater importance of recreational sports programs for their continuation at the university. Seventy-four percent of students indicated that recreational sports facilities were important in their decision to continue at their current university, and again, both depth ($p<0.001$) and breadth ($p<0.001$) of activity were significant in this relationship. While this study had strengths of evaluating a national sample and investigating both breadth and depth of participation, it is limited by a lack of control for potentially confounding variables.

Overall, further research is needed to investigate multi-institutional datasets and consider other variables that could impact academic success. Addressing these previous research limitations could make a stronger argument for the importance of recreational sports participation in student academic success. Therefore, the purpose of this study was to evaluate five years of data from the NASPA Assessment and Knowledge Consortium Recreation and Wellness Benchmark survey for relationships between recreational sports participation and academic indicators of anticipated term GPA and anticipated likelihood of retention. Participation was assessed at various levels (i.e., user versus non-user, number of activities, and time invested). We hypothesized that students participating in recreational sports would be more likely to self-report higher anticipated term GPAs and likelihood of retention than non-users. Additionally, students who participate in a greater number of activities and with greater time investments would also be more likely to report higher anticipated term GPAs and likelihood of retention than non-users.

METHODS

Survey

Data used for this study were collected through the National Association of Student Personnel Administrators (NASPA) Assessment and Knowledge Consortium Recreation and Wellness Benchmark assessment. The National Intramural and Recreational Sports Association (NIRSA) partners with NASPA in administration of this assessment. Data included span across five academic years (2011-2012 through 2015-2016) and encompass 85 different institutions. This survey is administered in an online format and includes more than 130 different questions across different content areas related to recreational sports programs and facilities.

Study participants

Study participants were anonymous responders (N=135,325) to the survey during the timeframe specified above. Exclusion criteria included: 1) incomplete surveys (completion of less than 70 percent of questions of interest); 2) non-student status; 3) an age outside the normal college age range of 18 to 24 years; and 4) collegiate varsity level sport participation. The sample included undergraduate students as well as graduate and professional program students.

Exposure Variables

The exposure variable of interest was recreational sports participation, which was assessed in three different methods: user versus non-user, number of activities participated in by users, and time invested in participation by users. User versus non-user classification was determined using the following question, "Do you utilize any of the on-campus [REC] facilities, programs, or services? Yes or No." Number of activities was determined from a list of 13 different activities included in the survey. Respondents were asked to identify the frequency at which they participated in each activity, and responses were recoded as either a "Yes" or "No" to

participation in that activity in order to achieve total number of activities participated in by each respondent. Number of activities participated in was totaled and ranked by tertile (high, moderate, or low number of activities). High status included participation in 7 to 13 different activities, moderate status was 4 to 6 different activities, and low status was 0 to 3 different activities. Time invested was computed using responses from two different survey questions: the frequency of visits (times per week) and the length of time of each visit (minutes per visit). Time invested scores were ranked by tertile (high, moderate, and low time investors). Examples of each of the rankings for time investment include: high users were respondents who utilized the facilities/programs four times per week for 30-59 minutes each time; moderate users were respondents who utilized the facilities/programs two times per week for 30-59 minutes each time; and low users were respondents who utilized the facilities one time per week for 30-59 minutes.

Outcome Variables

Two outcomes related to student academic success were evaluated: self-reported anticipated term GPA and self-reported likelihood of retention the next term. Anticipated semester GPA was assessed via the following question, "What is your expected GPA for this semester/quarter? Below 2.0, 2.0-2.4, 2.5-2.9, 3.0-3.4, or 3.5-4.0." Categories of "Below 2.0," "2.0-2.4," and "2.5-2.9" were combined for statistical purposes. Likelihood of retention the next term was assessed via the following question, "How likely is it that you will be enrolled at this college/university next semester/quarter? Graduating, Extremely Unlikely, Somewhat Unlikely, Not Sure, Somewhat Likely, or Extremely Likely." Since we were interested in current students who may be retained, respondents indicating "Graduating" were removed from this analysis. For analyses, categories of "Extremely Unlikely" and "Somewhat Unlikely" were combined into an

"Unlikely" category, and a category of "Likely" was developed from a combination of "Extremely Likely" and "Somewhat Likely."

Covariates

Several covariates were assessed due to their previously determined relationships with recreational sports use and academic success. These included: year the survey was completed, gender (DesJardins, Ahlburg, & McCall, 2002; Reason, 2009; Zheng, Saunders, Shelley, Mack, & Whalen, 2002), race (DesJardins et al., 2002; Reason, 2009; Zheng et al., 2002), class standing (Reason, 2009), enrollment status (Szafran, 2002), current residence (Nowack & Hanson, 1985), citizenship (Andrade, 2006), sexual orientation (Sanlo, 2004), percent of expenses covered by the respondent (Tinto, 2006; Upcraft, Gardener, & Barefoot, 2005), major subject area (Whalen & Mack C Shelley II, 2010), military status (Semer & Harmening, 2015), and first generation student status (Ishitani, 2003).

The majority of covariates were re-categorized by combining response categories of the questions for statistical purposes. Race was analyzed as "White" and "Other." Gender included "Male" or "Female"; there was a small response rate of "Transgendered" (0.2%), "Other" (0.3%), and "Prefer Not to Respond" (0.8%) in the sample who were not analyzed. Graduate and professional student categories for class standing were combined. Current residence was dichotomized into "On Campus" or "Other." Major subject area was also dichotomized into "Health Sciences" or "Other." All other covariates were analyzed in their original forms.

Statistical Analyses

Prior to analyses, a multiple imputation protocol (fully conditional specification) was utilized to address missing data within the sample (Liu & De, 2015). Statistical analyses included the calculation of percentages for all variables of interest. Multinomial logistic regression was

used to evaluate the role of exposure variables in the likelihood of outcome variables. The referent group was non-participants. Analyses were conducted for both unadjusted and adjusted models for all research questions. Chi-square analyses were used to identify significant covariates for adjusted models. All analyses were conducted in SPSS 24.0 statistical software, and an alpha level of $p < 0.05$ was used to indicate statistical significance.

RESULTS

Study Participants

The final analytic sample included 64,483 (48% of survey respondents) students from 85 different universities, was primarily female (62.8%), white (70.8%), and full time students (94.3%). Study respondents included freshmen, graduate, and professional students, and 20.9 percent of the sample reported being first generation college students. The majority of respondents reported participating in recreational sports at their universities (82.6%). See table 5.1 for additional demographic characteristics.

Grade Point Average

As seen in table 5.2, relationships varied depending on the level of recreational sports exposure. When evaluating differences between users and non-users and adjusting for significant covariates, recreational sports users were more likely to self-report an anticipated term GPA of 3.0-3.4 as opposed to a 2.9 or below than non-users, *aOR* = 1.08, 95% CI [1.01, 1.15]. There was no significant difference when evaluating differences between users and non-users for self-reporting a 3.5-4.0 compared to a 2.9 or below, *aOR* = 1.05, 95% CI [0.98, 1.12]. When investigating recreational sports usage at a deeper level, significant findings were also present for participation in a moderate number of activities or at a high time investment. Students

participating in a moderate number of activities (i.e. 4 to 7 different activities) were more likely to self-report a 3.5-4.0 versus a 2.9 or below than non-users, *aOR* = 1.09, 95% CI [1.02, 1.17], and similar relationships were found for the likelihood of reporting a 3.0-3.4 versus a 2.9 or below, *aOR* = 1.13, 95% CI [1.05, 1.21]. No significant differences were found for participation at a low or high number of activities. Additionally, students participating at a high time investment (i.e. four times per week for 30-59 minutes per visit) were more likely to self-report a 3.5-4.0 versus a 2.9 or below than non-users, *aOR* = 1.13, 95% CI [1.04, 1.22], and similar relationships were found for the likelihood of reporting a 3.0-3.4 versus a 2.9 or below, *aOR* = 1.17, 95% CI [1.08, 1.27]. No significant differences were found for participation with a low or moderate time investment.

Significant covariates included in analyses included gender, X^2 (2, N = 64,483) = 299.96, $p < .001$, LGBTIQ status, X^2 (2, N = 64,483) = 31.96, $p < .001$, race, X^2 (2, N = 64,483) = 1,324.52, $p < .001$, international student status, X^2 (2, N = 64,483) = 534.84, $p < .001$, current residence, X^2 (2, N = 64,483) = 184.51, $p < .001$, class standing, X^2 (2, N = 64,483) = 1,383.47, $p < .001$, enrollment status, X^2 (2, N = 64,483) = 84.95, $p < .001$, first generation student status, X^2 (2, N = 64,483) = 341.53, $p < .001$, health major, X^2 (2, N = 64,483) = 142.45, $p < .001$, military service, X^2 (2, N = 64,483) = 13.21, $p = .003$, college expenses responsible for, X^2 (2, N = 64,483) = 13.75, $p = .001$, and academic year, X^2 (2, N = 64,483) = 127.29, $p < .001$. Chi-square values were averaged across imputed datasets as pooled values are not available in outputs.

Retention

Table 5.3 depicts relationships for self-reported likelihood of retention next term based on recreational sports user level. Overall, 83.8 percent of the sample indicated that they were likely to return to their university the following term. No significant differences were found

between users and non-users, based on number of activities participated in, or based on time invested after adjusting for significant covariates in relationships.

Significant covariates included in analyses included race, X^2 (1, N = 64,483) = 15.99, p < .001, international student status, X^2 (1, N = 64,483) = 41.47, p < .001, class standing, X^2 (1, N = 64,483) = 27.34, p < .001, enrollment status, X^2 (1, N = 64,483) = 142.49, p < .001, military service, X^2 (1, N = 64,483) = 28.15, p < .001, college expenses responsible for, X^2 (1, N = 64,483) = 15.05, p < .001. Chi-square values were averaged across imputed datasets as pooled values are not available in outputs.

Table 5.1

Demographic variables by self-reported recreational sports usage status

Variable	Total	Users	Non-Users
n	64,483	53,247	11,236
Gender (%)			
Female	62.8	62.0	66.8
Male	37.2	38.0	33.2
LGBTIQ Status (%)			
Yes	5.7	5.3	7.2
No	94.3	94.7	92.8
Race (%)*			
White	70.8	71.0	77.2
Other	29.2	29.0	22.8
International Student Status (%)			
Yes	4.1	4.1	4.1
No	95.9	95.9	95.9
Current Residence (%)			
On-Campus	40.3	44.0	22.4
Other	59.7	56.0	77.6
Class Standing (%)			
Freshman	22.0	23.1	16.7
Sophomore	20.3	21.2	16.8
Junior	24.4	24.1	25.7
Senior	24.0	23.6	26.2
Graduate/Professional	9.3	8.0	14.6
Enrollment Status (%)			
Full time	94.3	95.6	87.8
Less than full time	5.7	4.4	12.2
First Generation Student Status (%)			
Yes	20.9	20.3	24.0
No	79.1	79.7	76.0
Health Major (%)			
Yes	16.5	17.4	12.5
No	83.5	82.6	87.5
Military Service (%)			
Yes	1.9	1.8	2.3
No	98.1	98.2	97.7
College Expenses Responsible For (%)			
0%	16.7	16.5	17.3
1-25%	28.2	29.1	24.0
26-50%	14.5	15.0	12.2
51-75%	10.3	10.6	9.2
76-100%	30.3	28.8	37.3

Table 5.1 (cont'd)

Academic Year (%)			
2011-2012	10.3	10.2	10.5
2012-2013	28.9	27.9	33.3
2013-2014	19.4	19.6	18.5
2014-2015	16.0	16.4	14.2
2015-2016	25.4	25.9	23.5

Note. Race category 'Other' includes African American/Black, Asian/Pacific Islander, Hispanic/Latino/a, Indigenous/Native American/American Indian, Multiracial, and Other

Table 5.2

Odds ratios for self-reported anticipated term GPA by recreational sports user status

	3.5-4.0 vs Below 2.9		3.0-3.4 vs Below 2.9	
Variable	**OR [95% CI]**	**aOR[a] [95% CI]**	**OR [95% CI]**	**aOR[a] [95% CI]**
Users	1.09* [1.02-1.16]	1.05 [0.98-1.12]	1.13* [1.06-1.20]	1.08* [1.01-1.15]
Number of Activities				
Low	1.09* [1.01-1.18]	1.08 [0.99-1.18]	1.07 [0.99-1.16]	1.05 [0.97-1.13]
Moderate	1.16* [1.08-1.24]	1.09* [1.02-1.17]	1.20* [1.11-1.28]	1.13* [1.05-1.21]
High	0.99 [0.92-1.07]	0.95 [0.88-1.03]	1.08 [0.99-1.17]	1.04 [0.96-1.13]
Time Invested				
Low	1.04 [0.97-1.12]	0.99 [0.92-1.06]	1.06 [0.98-1.14]	1.01 [0.94-1.09]
Moderate	1.10* [1.02-1.18]	1.04 [0.97-1.12]	1.11* [1.03-1.19]	1.06 [0.98-1.15]
High	1.13* [1.05-1.22]	1.13* [1.04-1.22]	1.22* [1.13-1.31]	1.17* [1.08-1.27]
Non-Users	1	1	1	1

[a] Adjusted model includes: gender, LGBTIQ status, race, international student status, current residence, class standing, enrollment status, first generation student status, health major, military service, college expenses responsible for, academic year

*Statistically significant by 95% CI

Table 5.3

Odds ratios for likelihood of self-reported retention next term by recreational sports user status

	Likely vs Not Sure/Unlikely	
Variable	**OR [95% CI]**	**aOR[a] [95% CI]**
Users	1.09 [0.98-1.21]	1.00 [0.90-1.12]
Number of Activities		
Low	1.02 [0.89-1.16]	0.94 [0.82-1.07]
Moderate	1.16* [1.02-1.31]	1.05 [0.92-1.19]
High	1.05 [0.93-1.19]	1.00 [0.88-1.14]
Time Invested		
Low	1.03 [0.91-1.16]	0.94 [0.83-1.06]
Moderate	1.18* [1.04-1.34]	1.09 [0.95-1.24]
High	1.07 [0.94-1.22]	0.99 [0.87-1.13]
Non-Users	1	1

[a] Adjusted model includes: race, international student status, class standing, enrollment status, military service, college expenses responsible for

*Statistically significant by 95% CI

DISCUSSION

The purpose of this study was to evaluate five years of data from the NASPA Assessment and Knowledge Consortium Recreation and Wellness Benchmark survey for relationships between recreational sports participation and academic indicators of anticipated term GPA and anticipated likelihood of retention. Previous work has primarily focused on single institution data

sets and included only one year of data, therefore, this work adds great value with multiple institutions and multiple years of data. Results of this study support the hypotheses that students who participate in recreational sports would be more likely to self-report higher anticipated term GPAs. However, hypotheses related to likelihood of retention were not supported.

Overall, this study's findings for GPA are consistent with previous research. Recreational sports participants were more likely to self-report higher anticipated term GPAs for the category of 3.0-3.4. Additionally, a moderate number of activities (i.e. 4 to 7 activities) and a high time investment (i.e. 4 times per week for 30 to 60 minutes per session) were associated with report of higher anticipated term GPAs. The students who are participating in a few (but not all) recreational sports programs, events and services and are committing a significant amount of time to those activities reported greater academic success. This finding supports the notion that engagement in quality experiences rather than just a high quantity of experiences can support student success.

Results for likelihood of retention are not consistent with previous research as most studies have found positive correlations between participation and retention. In this sample, there were no significant relationships between participation and likelihood of retention, regardless of number of activities or time invested. The sample overall had a very high percentage (83.8%) of students who "intended" to return to their university the following term. With the majority of the sample intending to return, this could have impacted abilities to evaluate differences between users and non-users within the sample. In addition, these responses did not necessarily equal the reality of who eventually returned to campus, and who did not.

It is important to note the strengths and limitations of this study when considering the results. There are major limitations to this study, such as the cross-sectional nature associated

with survey studies. Additionally, we are limited by the question format to only anticipated term GPA and likelihood of retention the next term. Strengths of this study include the large, national sample of data utilized, which adds to the generalizability of results. In addition, preparation of the data using a missing data protocol rather than removal of respondents with missing data was also a strength. Additionally, the evaluation of covariates in the analyses is key to furthering the literature in this area. Finally, this study explored multiple levels of recreational sports participation - user versus non-user status, number of activities, and time invested in participation.

Overall, this study has added to the current body of literature concerning recreational sports participation and student success by addressing some of the previous limitations of work by investigating a multi-institutional dataset and including covariates in analyses. Positive findings concerning GPA can be used to further support the impact that recreational sports can have on student academic success in college students. More research is needed regarding relationships with retention variables as results were insignificant within this sample. Additionally, researchers should attempt to combine objectively collected data (i.e., participation using ID card swipes and academic variables from university databases) from multiple universities to address issues with survey methodologies and self-report.

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CHAPTER SIX:

SUMMARY AND CONCLUSIONS

Recreational sports departments play valuable and unique roles on college campuses with abilities to promote physical activity through a wide range of programs and services to a diverse student population. Research has shown that the college years are critical for behavior development, including physical activity (Bray et al., 2011), and students who are physically active in college are more likely to be active later on in life (Forrester, Ross, Hall, & Geary, 2007; Sparling & Snow, 2002). Ensuring that adequate funds are available for recreational sports departments to meet students' physical activity needs is vital to positive behavior development. However, along with other divisions of student affairs, recreational sports departments have been tasked with demonstrating their contributions to student success to maintain funding (Haines, 2001). Previous researchers have explored possible links between participation in programs and use of facilities within campus recreation and student success, and small, but positive, relationships have been found. However, many of these studies are limited in sample size and lack appropriate methodology when investigating this complex relationship. Therefore, the purpose of this dissertation was to further examine relationships between recreational sports participation and college student academic success, while attempting to address major limitations of sample size and lack of control for confounding variables.

Through three different datasets, we investigated both national and institutional level data for different forms of participation available within recreational sports. Findings overall indicate that 1) students who participate in intramural and club sports are more likely to self-report higher grade averages than non-participants, and the strongest relationships are found in club sports

participants, 2) participation in intramural sports during the first year of college is associated with greater academic success among freshmen students, and 3) there are positive associations between participation in a moderate number of recreational sports activities and a high time investment in those activities and self-reported anticipated term GPAs, but no significant relationships between participation and likelihood of anticipated term retention. Overall, the results of this dissertation support previous literature in the suggestion that recreational sports participation is positively related to academic success in college students. One exception is the finding of no significant relationships between participation and likelihood of retention in the third study. One possible explanation for this finding is there was a high percentage of students reporting likelihood of retention next term (over 80 percent).

Implications of this work for practitioners in the recreational sports field and administrators are many. Theory supports that involvement is important in the development and success of college students (Astin, 1999; Tinto, 2006), and recreational sports participation is an accessible and inclusive form of involvement available on most college campuses. The results of this study align with these theories and further the research in this area by addressing more parts of the theory models (i.e. assessing frequency of use).

Specifically, this dissertation addresses four of the five postulates of Astin's Theory of Student involvement: 1) involvement in the investment of physical and psychological energy in objects; 2) involvement occurs along a continuum; 3) involvement is both quantitative and qualitative; and 4) student learning and professional development are directly proportional to involvement quantity and quality. The fifth postulate relates to the effectiveness of educational policy and practice being directly related to the capacity for student involvement. Across all studies in this dissertation, the following are supported: recreational sports participation is a

physical investment of energy (postulate 1), involvement can occur along a continuum with users of different frequencies (postulate 2), involvement can be quantified through self-report or measures such as identification card swipes (postulate 3). This study adds to the current body of literature in support that student learning is directly proportional to involvement quality and quantity through the results associated with specific aim three, which focused on numbers of activities and time investment of participation (postulate 4). Finally, results of this dissertation work can be used to support the fifth postulate of Astin's theory by supporting policy that will increase access to and encourage participation in recreational sports on college campuses. This dissertation work also supports Tinto's theory, specifically concerning participation in club and intramural sports. Students who have found a place to incorporate their previous beliefs/values related to physical activity, possibly from high school sport participation, in club and intramural sports are more likely to achieve greater success than non-participants. When evaluating specific aim two, strong relationships were identified between intramural sports participation and academic success during the first year of college, demonstrating the importance of incorporation into the campus community. Overall, this dissertation further supports the current theories and expands on the context in which they are applicable.

In addition to any physical health benefits students receive from being physically active, this dissertation has demonstrated that there is a relationship present for academic benefits as well. This knowledge should be utilized to leverage more funding for recreational sports programming and services to better provide access to physical activity on campus. Additionally, students should be made aware of the benefits of recreational sports participation, in terms of both physical health and academic impact, to further encourage a physically active lifestyle.

STRENGTHS AND LIMITATIONS

While this dissertation work had many strengths that have benefited the recreational sports literature overall, there are also limitations. Strengths to this work include the investigation of two large, national-level datasets concerning recreational sports behaviors and academic success. These data were each from recognized, national organizations in college student health and student affairs, and they provided a more generalizable result than previous work that focused primarily on single institutions. Additionally, each study in this dissertation evaluated and accounted for the impacts of confounding variables in analyses of relationships by conducting adjusted analyses or generating a matched dataset. It is known that student success is a very complex model with many variables playing a role in relationships, and many previous studies in this field failed to adjust or control for these in the analyses. The current studies provide a much stronger argument for the presence of positive relationships with the adjustment for these variables. Other strengths include the investigation of specific forms of recreational sports participation in the first and second studies (i.e., club and intramural sports), and the investigation of different modes to quantify participation in the third study (i.e., number of activities and time investment).

Limitations to this work include a large dependence on cross-sectional, self-reported data. Additionally, as this self-reported data was collected via survey methods, there were also constraints in the question wording. For example, the third study was only able to assess anticipated term outcomes, rather than current and cumulative academic outcomes. While the second study used objectively collected data (i.e. data from the university registrar and identification card swipes), it was limited in scope and generalizability as it only included one institution and a limited sample of freshmen students.

FUTURE RESEARCH DIRECTIONS

While this dissertation work addressed some of the limitations to current research, more studies are needed to assess further the relationships between recreational sports and college student academic success. Future research should evaluate national-level data that have been objectively collected through the use of university databases. Additionally, more work is needed on the impacts of frequency of participation. Longitudinal studies are also needed in this area of research. Few studies have evaluated the impacts of participation over the course of a student's college career or on graduation rates. Finally, interdisciplinary work is needed to develop results into policy and to communicate the benefits of recreational sports participation appropriately to the campus community, including administrators, faculty, staff, and students.

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