

Sport Club Participation and Health-Related Outcomes in College Students: Comparisons by Sex and Academic Classification

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Abstract:

Using the theory of student involvement, the purpose of this study was to compare sport club participation and health-related outcomes, as well as the association between these two variables by sex and academic classification among college students. Participants were 127 sport club members recruited from a university in the southwestern United States. MANOVA analyses indicated that males reported more recreation center visits, greater sport club satisfaction, and lower subjective vitality than females; freshmen reported more recreation center visits and higher grade point averages (GPAs) than nonfreshmen. Canonical correlation analyses revealed that sport club satisfaction was positively related to GPA and subjective vitality, and sport club memberships were positively related to body mass index in the overall sample. Group differences were found in the direction and magnitude of these relationships. Thus, campus recreation professionals should consider sex and freshman status of sport club participants to target their diverse needs for optimal health-related outcomes.

Keywords: academic performance | college freshman | sex differences | student involvement | well-being

Article:

Recreational sports are co-curricular activities on campus in which any college student can participate. The Council for the Advancement of Standard (CAS, 2009) states that “recreational sports programs are viewed as essential components of higher education, supplementing the educational process through enhancement of students’ physical, mental, and emotional development” (p. 330). Research has also indicated that involvement in recreational sports contributes to multiple physical, cognitive, and psychological outcomes, such as health behaviors (Haines & Fortman, 2008), academic achievements (Gibbison, Henry, & Perkins-Brown, 2011), and stress reduction (Kanters, 2000). Recreational sports offer a variety of activities including sports clubs, intramurals, group exercise, and personal training. In the United States, sport clubs

are regulated by the National Intramural-Recreational Sports Association (NIRSA), serving college students who play sports at a more recreational level than varsity sports (e.g., National Collegiate Athletic Association [NCAA], National Association of Intercollegiate Athletics [NAIA]). Sport clubs allow individuals across skill levels to learn and compete in a sport with less emphasis on winning. Thus, sport club participation is related to learning in an out-of-class context as well as voluntary involvement in campus activities.

Based on the theory of student involvement in higher education (Astin, 1984), the time and energy spent on out-of-class activities are positively associated with the amount of student learning and personal development. Astin (1984) defined student involvement as “the investment of physical and psychological energy in various objects” (p. 298). As sport club participation requires students to invest in both physical and psychological energy, it is likely associated with greater student learning and development. For instance, Haines and Fortman (2008) conducted a study on 954 sport club participants from two universities, where they found significant increases in all 41 outcomes (e.g., sense of belonging, self-esteem, and expanded personal and educational goals) after sport club participation. Moreover, students with sport club participation had a higher rate of college retention than those without sport club participation (Kampf & Teske, 2013). When comparing participation in intramural sport with group fitness, sport club participants reported the highest intellectual, social, and fitness benefits (Lower, Turner, & Petersen, 2013). The findings from these studies suggest unique cognitive and psychosocial benefits of sport club participation to encourage further research on their underlying mechanisms.

Another postulate of the student involvement theory pertains to the quantitative and qualitative features of the involvement (Astin, 1984). In a sport club setting, the number of recreation facility visits and sport club memberships can represent the quantitative features of time and energy investment. The results of the 2013 NASPA Assessment and Knowledge Consortium, from 33,522 students and 28 institutions (Forrester, 2015), indicate that the frequency and the amount of recreational sports participation are related to increases in student learning (e.g., academic performance, sense of belonging) and health-related outcomes (e.g., subjective well-being, fitness level). Because sport club practices and activities mostly occur on campus, sport club participants who visit the recreation facility more frequently may obtain more benefits. The number of sport club memberships indicates the amount of involvement, yet it has not been studied in previous research (Sweeney & Barcelona, 2012). In addition, sport club satisfaction denotes the qualitative features of the involvement. For instance, leisure satisfaction is associated with college students’ perceived importance of sports and fitness activities after graduation (Forrester, Arterberry, & Barcelona, 2006). Additionally, Lewis, Barcelona, and Jones (2001) proposed that leisure satisfaction is crucial to overall life satisfaction and is a stronger predictor of subjective wellbeing and quality of life than other predictors such as leisure participation levels and satisfaction in other life domains. These authors further emphasized the importance of measuring leisure satisfaction beyond participation levels in collegiate recreational sports. However, Sweeney and Barcelona’s integrative review (2012) indicates that sport club satisfaction has not received attention in recreational sports literature. Since then, there have only been two empirical studies on sport clubs, published in the *Recreational Sports Journal*, investigating the experiences of sport club presidents (Flosdorf, Carr, Carr, & Pate, 2016) and perceived benefits of sport clubs (Lower et al., 2013), respectively. Due to limited research evidence on collegiate sport club experiences, little is known regarding how sport club participation is associated with health-related outcomes (Todd, Czynszczon, Carr, & Pratt, 2009), and how the associations may differ across individuals.

According to the perceptions of 262 recreation professionals, gender equity was lower among sport clubs than intramural sports programs, in that women's programs lacked support services, participation opportunities, coaching, funding, facilities, and publicity (Schneider, Stier, & Kampf, 2014). This likely affects the participation quantity and quality of sport club participants. Previous research has investigated the differences in social outcomes of intramural sports across sex and academic classifications (Artinger et al., 2006; Sturts & Ross, 2013). The studies found that, on average, female participants reported greater social benefits than male participants in terms of teamwork, bonding with teammates, social interaction skills, community involvement, commitment to peers, willingness to learn about other cultures, time management, college satisfaction, and overall happiness. Further, freshmen reported greater tolerance of different cultures, sense of responsibility, and sense of belonging in college than seniors or above (Artinger et al., 2006), as well as greater college satisfaction than sophomores (Sturts & Ross, 2013). Given that freshmen are a special group of college students who mostly live on campus and experience a major transition in lifestyle from high school (Bray & Kwan, 2006; Downs & Ashton, 2011), it is particularly important to compare sport club participation and health-related outcomes of students by freshman status: freshmen and nonfreshmen (i.e., sophomores, juniors, seniors, and graduate students). Understanding these potential differences between sport club participation and health-related outcomes in terms of sex and academic classification will help us inform intervention strategies by considering specific needs and characteristics of various sport club participants.

Due to heightened obesity and mental health concerns presented by college students (Brown & Fry, 2014), body composition (physical), academic performance (cognitive), and subjective vitality (psychological) are crucial health-related outcomes to examine in this study. Body mass index (BMI) is an indicator of body composition and corresponding health risks. A recent meta-analysis of weight gain in college freshmen showed that appropriately 60% of freshmen gained weight during their first year of college and 10% of them gained at least 15 lb, known as the "Freshman 15" (Vadeboncoeur, Townsend, & Foster, 2015). A major reason for this weight gain is a decrease in total physical activity, including sports and exercise, during their transition from high school to college. In a qualitative study, college students reported that the transition to college meant an end to organized sports, and some of them had a priority of making friends over doing physical activities (LaCaille, Dauner, Krambeer, & Pedersen, 2011). Todd and colleagues (2009) found that students who were high campus recreation users reported higher physical activity levels, lower fat intake, and lower BMI than moderate users, low users, and nonusers. Given that increased BMI and physical inactivity add risks for cardiovascular disease during students' transition from high school to college (World Health Organization, 2016), sport club participation can potentially reverse this health trend as it provides a learning environment for physical and psychosocial benefits (Haines & Fortman, 2008).

Physical activity enhances cognitive functions through increased blood flow and arousal levels of the brain (Shephard, 1997). For college students, academic performance is an important cognitive outcome of participation in sports and exercise (Todd et al., 2009). Gibbison et al. (2011) examined the role of recreational sports participation on college freshmen's grade point average (GPA) over time and found that those visiting the recreational facility more than five times a month had a mean GPA of 0.30 points higher than those visiting it less often. Moreover, students who increased their recreation visits reported a higher GPA. Another study on 4,843 freshmen had similar findings that recreational sports and fitness center members had an average GPA of 0.13 points higher than nonmembers (Danbert, Pivarnik, McNeil, & Washington, 2014). Todd and

colleagues (2009) also found higher GPAs in college students who were high campus recreation users. Beyond GPA, greater recreational facility use predicted higher rates of first-year retention and five-year graduation, indicating greater academic success (Huesman, Brown, Lee, Kellogg, & Radcliffe, 2009). In relation to intramural sports participation, Moffitt (2010) suggests that participants are more likely to be engaged in academic life than nonparticipants. Further, McElveen and Rossow (2014) found higher retention rates among intramural participants than nonparticipants. In the same study, however, no significant differences in GPA were found among students participating in no intramural sports, one to three intramural sports, and four or more intramural sports. Although these studies have examined the associations of academic performance with recreational facility use and/or intramural sports participation, little, if any, research has examined this relationship specifically with sport club participation among college students. Since sport club participation enhances student identification with school and academic retention (Kampf & Teske, 2013), it likely also plays a positive role in academic performance among college students.

Beyond physical and cognitive health, physical activity is an important factor for psychological health during college years (Bray & Kwan, 2006), a critical time for the development of long-term mental health (Downs & Ashton, 2011). Specifically, vigorous physical activity (VPA), mostly acquired through sports and high-intensity exercise, is a protective factor for psychological health by enhancing positive moods (Berger & Owen, 1998; Dunn & McAuley, 2000). Since sport club participation can be an important contributor to physical activity, VPA in particular, the quantity and quality of participation may be related to psychological well-being. For example, sport club participants demonstrated greater self-understanding, self-esteem, self-respect, anger management, and confidence to succeed as compared to before their sport club participation (Haines & Fortman, 2008). Recent national data (American College Health Association, 2016) indicated that only about one-fourth of college students in the United States reported engagement in the recommended amount of VPA (75 min/week; U.S. Department of Health and Human Services, 2008), and about one-fourth of college students suffered from at least one mental health condition (e.g., anxiety, substance abuse) in the past year. Thus, understanding the relationships between sport club participation and psychological well-being may help campus recreation professionals promote physical activity as well as reduce mental health issues among college students. Subjective vitality, a positive feeling of having self-generated energy and a key indicator of personal well-being (Ryan & Frederick, 1997), was investigated in this study. This well-being construct is meaningfully defined within theories of human functioning and influenced by both somatic (e.g., perceived body functioning) and psychological factors (e.g., affective dispositions).

To our knowledge, no previous studies have examined the quantity and quality of sport club participation, and how they were related to health-related outcomes in college students. The first purpose of this study, therefore, was to examine participation quantity and quality (frequency of recreation center visits, number of sport club memberships, and sport club satisfaction) as well as health-related outcomes (body composition, academic performance, and subjective vitality) by sex and freshman status. The second purpose was to examine the multivariate relationships between participation quantity, participation quality, and health-related outcomes, which were also compared by sex and freshman status. To explore the phenomenon, we attempted to answer the following research questions:

1. Did male and female sport club participants as well as freshman and nonfreshman participants have different sport club participation quantity and quality and health-related outcomes? If so, what variables were the significant and primary contributors to these differences?
2. Did male and female sport club participants as well as freshman and nonfreshman participants have different associations of sport club participation quantity and quality with health-related outcomes? If so, what variables were the significant and primary contributors of these differences in their multivariable relationships?

Method

Participants and Procedures

Participants were 146 sport club members ($M_{age} = 19.88 \pm 2.68$ years) attending a large-sized public university in the southwestern United States. There were 76 males and 70 females, including 59 freshmen, 26 sophomores, 32 juniors, 23 seniors, and six graduate students. The majority of participants were Caucasian/ White (63.7%). Other racial/ethnic groups included Hispanic/Latino (15.8%), Asian (8.9%), African American/Black (6.2%), and other (5.5%). All participants were a member of at least one sport club. The sample consisted of approximately 20% of all sport club members, which was representative of the university population in terms of sex and race/ethnicity. All sport club members from a variety of sports were eligible to participate in the study, including men's teams (e.g., men's soccer, men's volleyball), women's teams (e.g., women's soccer, women's volleyball), and co-ed teams (e.g., running, tennis).

After the study was approved by the university's institutional review board (IRB), participants were recruited through email and invited to complete a 15-min online survey, with informed consent, in fall 2014 ($n = 79$) and spring 2015 ($n = 67$). Participants answered survey items regarding demographic information, sports and exercise behavior, and the following variables.

Measure

Participation quantity and quality. Based on a sport club evaluation survey of the university's recreational sports department, three single-item measures were modified to assess quantity and quality of sport club participation: (a) average recreation center visits per week ("How often do you visit the recreation center?"); (b) number of sport club memberships ("How many sport clubs are you a member of in the current academic year?"); and (c) sport club satisfaction ("Please rate your overall sport club experience on a scale of 1–5 [extremely negative to extremely positive]").

Health-related outcomes. Three different domains (i.e., physical, cognitive, and psychological) of health-related outcomes were assessed with self-report responses of (a) BMI, calculated from self-reported height and weight using the formula ($\text{weight}[\text{lb}]/\text{height}[\text{in}]^2 \times 703$); (b) cumulative college GPA; and (c) a 7-item subjective vitality scale (SVS; Ryan & Frederick, 1997). Based on the instruction used by Reinboth and Duda (2006), the SVS scale was modified to address the exercise context ("Please respond to each of the following statements regarding the period of your exercise using a Likert scale of 1–7 [strongly disagree to strongly agree]"). A sample item was "I feel alive and vital". The internal consistency of SVS in this sample was $\alpha = .85$.

Data Analysis

Because there were less than 5% of missing data, an expectation-maximization (EM) algorithm was used to replace the missing values accordingly (Graham, 2009). In the preliminary analysis, descriptive statistics and correlation coefficients were computed for all study variables. Prior to the multivariate analyses, multivariate outliers and normality assumptions for each sex were assessed using the graphical method MULTINOR (Thompson, 1990), which plotted chi-square values against Mahalanobis distance (D2). Two separate 2 x 2 MANOVAs were then conducted to examine whether group differences existed in the study variables as a function of sex and freshman status. If there were significant group differences, follow-up univariate analyses would be conducted to examine what groups differed in which variables.

In addition, five canonical correlation analyses (CCA) were performed to investigate the multivariate relationships between the linear combination of sport club participation quantity and quality (predictor or independent variables) and health-related outcomes (criterion or dependent variables) in the whole sample, in males and females, as well as in freshmen and nonfreshmen. CCA is a multivariate technique that reduces the probability of committing type I errors because it allows for simultaneous comparisons of dependent variables (Sherry & Henson, 2005). This analytical technique is especially useful in the field of social science since the research typically includes multiple independent and dependent variables that are correlated with each other. CCA is typically used to study the relationship between two variable sets, namely the predictor variable set and criterion variable set. Thus, it can be conceptualized as a bivariate correlation between the predictor and criterion variable sets that are weighted based on the relationships within each set (Sherry & Henson, 2005). To interpret the results, significant contribution of variables to each variable set was examined through standardized canonical function coefficients (similar to standardized regression coefficients) and structure coefficients (r_s). A structure coefficient is the bivariate correlation between a variable and the whole predictor/criterion variable set, which is independent of multicollinearity issues and provides the best interpretation of CCA (Levine, 1977). In this study, structure coefficients of .30 and above were considered a significant contribution to the predictor or criterion variable set (Tabachnick & Fidell, 2013).

Results

The means and standard deviations of study variables in the whole sample and each group are displayed in Table 1. Most of the participants had a physically active lifestyle. On average, they engaged in sports and exercise more than four times a week and visited the recreation center more than three times a week. Based on the MULTINOR analysis, a total of 19 (11 males, 8 females) multivariate outliers and nonnormal data were removed to reduce their impact on the results. The graphs of the final sample ($N = 127$; 65 males, 62 females) formed an approximate straight line that met the multivariate normality assumption of the study variables for each sex and freshman status. Other assumptions for multivariate analyses were also tested and met for conducting MANOVAs and CCAs. The two MANOVAs showed significant main effects for sex in both participation quantity and quality (Pillai's trace = .08, $F[3, 121] = 3.39$, $p < .05$) and health-related outcomes (Pillai's trace = .07, $F[3, 121] = 3.15$, $p < .05$), with small effect sizes (partial $\eta^2 = .07$ and .08, respectively). Follow-up univariate analyses indicated that males reported more recreation center visits and greater sport club satisfaction than females, whereas females reported higher subjective vitality than males. Moreover, there were significant main effects for freshman status in

both participation quantity and quality (Pillai's trace = .06, $F[3, 121] = 2.51$, $p < .05$) and health-related outcomes (Pillai's trace = .08, $F[3, 121] = 3.15$, $p < .05$), with small effect sizes (partial $\eta^2 = .07$ and $.06$, respectively). Follow-up univariate analyses revealed that freshmen reported more recreation center visits and higher GPA than nonfreshmen. No significant interaction effects were shown in the models ($ps > .05$).

Table 1. Means and Standard Deviations of Study Variables in the Overall Sample, by Sex and by Freshman Status

	Overall (n = 127)	Males (n = 65)	Females (n = 62)	Freshman (n = 55)	Nonfreshman (n = 72)
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>
Recreation center visits	3.31 (1.75)	3.62 (1.77)*	3.00 (.22)*	3.71 (1.66)*	3.01 (1.77)*
Sport club membership	1.15 (.37)	1.14 (.40)	1.17 (.34)	1.14 (.30)	1.16 (.42)
Sport club satisfaction	4.47 (.51)	4.59 (.47)*	4.35 (.52)*	4.57 (.32)	4.40 (.60)
BMI	22.48 (3.26)	21.92 (2.72)	23.07 (3.68)	22.09 (3.09)	22.78 (3.38)
GPA	3.36 (.42)	3.34 (.41)	3.38 (.43)	3.46 (.36)*	3.29 (.45)*
Subjective vitality	5.39 (.89)	5.23 (.88)*	5.56 (.86)*	5.29 (.99)	5.47 (.80)

Abbreviations: BMI = body mass index; GPA = grade point average.

Note. * $p < .05$ represents the significant differences between the sexes or freshman statuses based on the MANOVA results.

Bivariate correlation analyses showed that most study variables were positively correlated with each other. The CCA results demonstrated significant multivariate relationships in the whole sample (Wilk's $\lambda = .83$, $F[9, 294.63] = 2.64$, $p < .01$) and in males (Wilk's $\lambda = .70$, $F[9, 143.51] = 2.54$, $p < .05$), but not in females (Wilk's $\lambda = .75$, $F[9, 136.44] = 1.88$, $p = .06$), freshmen (Wilk's $\lambda = .75$, $F[9, 119.40] = 1.64$, $p = .11$), or nonfreshmen (Wilk's $\lambda = .84$, $F[9, 160.78] = 1.71$, $p = .22$). The canonical functions of all groups were examined, as researchers should consider effect sizes (Rc 2: squared canonical correlations) beyond the statistical significance test influenced by sample size (Sherry & Henson, 2005). The first functions of all CCAs explained more than 10% of the shared variance between the two variable sets and thus were interpreted. The second function of the CCA in the whole sample was also interpreted due to the significant dimension reduction analysis in function 2–3 (Wilk's $\lambda = .92$, $F[4, 244] = 2.61$, $p < .05$). The second functions of other CCAs and all third functions were not interpreted because none of them were statistically significant or explained more than 10% of the remaining variance beyond the first functions. The results of all first functions are displayed in Table 2.

In the first function of each CCA, participation quantity and quality shared between 10–21% of variance with health-related outcomes. In the overall sample, the predictor variables and criterion variables were positively correlated, sharing approximately 10% of the variance in the first function and 8% of the remaining variance in the second function. In the first function, participation quantity and quality was primarily defined by sport club satisfaction ($rs = -.99$; 98% shared variance), and health-related outcomes were primarily defined by GPA ($rs = -.96$; 93% shared variance), with subjective vitality making a secondary contribution ($rs = -.40$; 16% shared variance). In the second function, participation quantity and quality was primarily defined by sport club memberships ($rs = -.94$; 88% shared variance), and health-related outcomes were primarily defined by BMI ($rs = -.97$; 95% shared variance). In the first function of CCAs across sex and freshman statuses, sport club satisfaction positively and primarily contributed to participation

Table 2. Canonical Correlation Analyses in the Overall Sample, by Sex and by Freshman Status

	Overall (n = 127)		Males (n = 65)		Females (n = 62)		Freshmen (n = 55)		Nonfreshman (n = 72)	
	Coeff	<i>r_s</i>	Coeff	<i>r_s</i>	Coeff	<i>r_s</i>	Coeff	<i>r_s</i>	Coeff	<i>r_s</i>
Participation quantity and quality										
Recreation center visits	-.09	-.20	-.38	-.27	-.12	.14	-.20	.02	.29	.32
Sport club memberships	-.13	-.16	-.68	-.61	.24	.36	-.57	-.56	.68	.71
Sport club satisfaction	-.97	-.99	.67	.71	.96	.97	.84	.81	.62	.68
<i>R_c²</i>	9.94%		21.22%		16.43%		19.33%		10.98%	
Health-related outcomes										
BMI	.10	.15	-.92	-.91	.30	.32	-.68	-.88	.45	.53
GPA	-.92	-.96	-.06	.19	.94	.95	.50	.77	.59	.78
Subject vitality	-.25	-.40	.43	.40	.09	.10	.06	.23	.50	.60

Abbreviations: BMI = body mass index; Coeff = standardized canonical coefficient; GPA = grade point average; R_c^2 = squared canonical correlations; r_s = structure coefficient.

Note. Only the statistics from the first functions are included. r_s greater than $|\cdot 30|$ are bolded.

quantity and quality, with sport club memberships mostly making a secondary contribution (positive or negative). Recreation center visits were a significant contributor only in nonfreshmen. In contrast, the significant contributors to health-related outcomes were different across groups. Regarding sex, BMI was a primary contributor and subjective vitality was a secondary contributor in males, whereas GPA was a primary contributor and BMI was a secondary contributor in females. Regarding freshman status, BMI and GPA were significant contributors in both freshmen and nonfreshmen, although the contribution of BMI was of opposite direction. Furthermore, subjective vitality significantly contributed to the health-related outcomes in nonfreshmen but not in freshmen. Therefore, a major difference was found in the associations of participation quantity and quality with health-related outcomes as a function of sex and freshman status. The specific multivariate relationships of each group were as follows:

1. Males: Fewer sport club memberships and greater sport club satisfaction were associated with higher BMI and subjective vitality.
2. Females: Greater sport club memberships and sport club satisfaction were associated with higher BMI and subjective vitality.
3. Freshman: Fewer sport club memberships and greater sport club satisfaction were associated with lower BMI and higher GPA.
4. Nonfreshman: More recreation center visits, as well as greater sport club memberships and sport club satisfaction, were associated with higher BMI, GPA, and subjective vitality.

Discussion

This study was designed to investigate sport club participation and health-related outcomes as a function of sex and academic classification. Differences in study variables were shown between the sexes and freshman statuses, but not their interactions. Males and freshmen had more recreation center visits than females and nonfreshmen, respectively. These differences are consistent with previous research on recreation center usage (Watson, Ayers, Zizzi, & Naoi, 2006) and overall physical activity (American College Health Association, 2016; Small, Bailey-Davis, Morgan, &

Maggs, 2013). Thus, campus recreation professionals and student leaders should pay more attention to the individual needs of female and nonfreshman members in order to enhance their recreational facility use through intervention. Contrary to previous findings that females had greater satisfaction in recreational sports than males (Kovac & Beck, 1997), male participants in this study had greater sport club satisfaction than their female counterparts. This difference supports the notion that females enjoy recreational activities that are more inclusive and cooperative, whereas males enjoy recreational activities that are more competitive in nature (Kovac & Beck, 1997). Longitudinal studies on different types of sport club participation (e.g., individual vs. team sports, men's vs. women's vs. coed teams) are needed in order to understand the underlying nature and causes of this discrepancy. Given that all of the groups had high mean scores of recreation center visits (>3 times a week) and sport club satisfaction (>4.3 out of 5 points), the participation quantity and quality among participants were generally high in this study.

With respect to health-related outcomes, there were no significant differences in BMI between the sexes and freshman statuses. The majority of participants had a normal BMI range, likely due to regular sport participation. Deviating from previous studies on college GPA (Gayles, 2012; Grove & Wasserman, 2004), freshmen reported significantly higher GPA than nonfreshmen in this study. A reason may be that freshman sport club participants generally reported greater sport club satisfaction than their nonfreshman counterparts. Unexpectedly, females reported significantly higher subjective vitality during exercise than males in this study, which is in contrast to the U.S. college national data on mental health (American College Health Association, 2016). It is possible that females benefit from sports and exercise for greater energy levels and well-being than males, whereas inactive females suffer from lower subjective vitality than inactive males (Molina-García, Castillo,&Queralt, 2011). To more deeply understand this gender difference, further investigation in psychological needs of male and female sport club participants is warranted (Vlachopoulos & Karavani, 2009).

The relationships found between sport club participation and health-related outcomes were as expected. Consistent with the student involvement theory (Astin, 1984), participation quantity and quality were positively associated with health-related outcomes in the overall sample and across groups. Considering all participants, this relationship was defined by the association of sport club satisfaction with GPA and subjective vitality. This finding can be explained by the fact that sense of belonging, time management, and school pride were three of the top four learning outcomes in sport club participation (Haines & Fortman, 2008). These learning outcomes typically increase with sport club satisfaction and promote not only student identity but also academic success and well-being. Therefore, fostering a positive sport club experience should be a priority for campus recreation professionals as well as student leaders. Contrary to the literature (Gibbison et al, 2011; Todd et al., 2009), the frequency of recreation center visits was not a significant contributor to the relationship with health-related outcomes in the overall sample and most groups. One reason could be that some sport clubs practiced in the recreation center (e.g., volleyball) but some did not (e.g., soccer), which constituted baseline differences in recreation center visits.

Comparing the CCA results by sex and freshman status suggest several group differences in the magnitude of and contributors to the associations between sport club participation and health-related outcomes. Across groups, the only significant contributors with consistent relationships were sport club memberships ($|rs| = .36-.71$) and BMI ($|rs| = .32-.91$), indicating that more sport club memberships were related to higher BMI in each sex and freshman status. Although this sounds counterintuitive, it is possible that some overweight students might participate in more sport clubs in order to lose weight. This also implies that sport club participants

who focus on one sport may have better body composition and corresponding physical fitness than new participants who sample different sport clubs. It is important to note however, that some recreational athletes might have a higher BMI due to greater muscular mass in their body. Future studies should investigate why sport club members participate in multiple sport clubs in order to explain this interesting relationship with regard to body composition. For instance, researchers may investigate the nutritional aspects (e.g., diet) associated with sport club participation since they are contributing factors for changes in body composition (LaCaille et al., 2011).

Regarding sex differences, the two set of variables shared approximately 5% more variance in males than females. The number of sport club memberships was a negative contributor to the relationship with subjective vitality in males, but a positive contributor to the relationship with GPA in females. Thus, participating in more sport clubs could be potentially detrimental to males but beneficial to females. Although sport club satisfaction was a primary contributor in both sexes, it was a stronger predictor in females ($r_s = .97$) than males ($r_s = .71$). Additionally, greater sport club satisfaction was related to lower BMI in males but higher BMI in females. Future studies should examine the reasons for this gender difference, especially in females with a high body composition, in order to understand the potential negative health outcome in sport club participation. Examining the structure coefficients of GPA and subjective vitality, male and female participants exhibited different patterns of cognitive and psychological health in relation to sport club satisfaction. When sport club satisfaction increases, females may receive more academic and cognitive benefits than males, whereas males may gain more energy and psychological well-being than females.

With regard to the differences between freshman statuses, the two canonical variates shared approximately 8% more variance in freshman than nonfreshman sport club participants. The frequency of recreation center visits made a significant contribution to the participation quantity and quality of nonfreshmen but not freshmen. One explanation is that nonfreshmen generally live off campus instead of on campus as freshmen do. Visiting the recreation center can be seen as a commitment to be physically active and is therefore related to positive health-related outcomes. Sophomores, juniors, and seniors also reported spending less time engaging in sports and exercise than freshmen (Small et al., 2013). In this sense, each additional recreation center visit contributes more to the total physical activity of nonfreshmen than freshmen. Another indicator of participation quantity, sport club memberships, made a negative contribution for freshmen, but a positive contribution for nonfreshmen. On the other hand, the indicator of participation quality, sport club satisfaction, made a stronger contribution for freshmen than nonfreshmen. This suggests that freshmen's first-year sport club participation quality rather than quantity is crucial to facilitating positive health-related outcomes. For health-related outcomes, BMI was a negative contributor (i.e., positive outcome) in freshmen, but a positive contributor (i.e., negative outcome) in nonfreshmen in relation to sport club satisfaction. Thus, the promotion of a welcoming environment to sport club participants is a protective factor for substantial average weight gains during the freshman year (Vadeboncoeur et al., 2015). This protective mechanism, however, does not seem to hold true for nonfreshmen and needs further exploration in future studies. Examining the structure coefficients of other outcomes, GPA primarily and similarly contributed to the relationships in both freshmen and nonfreshmen, whereas subjective vitality made a significant contribution only in nonfreshmen as a secondary contributor. The consistent contribution of GPA supports existing evidence on the positive relationship between sport club participation and academic success (Gibbison et al., 2011; Kampf & Teske, 2013). The results suggest that freshmen may receive more physical health benefits, but less psychological health benefits, from a positive

sport club experience than nonfreshmen. Since there is limited evidence on health and wellness in recreational sports literature (Sweeney & Barcelona, 2012), future research should examine the mechanism behind the sociodemographic differences in health-related outcomes among sport club participants.

Conclusions

This study provides preliminary findings that suggest how sport club participation is differentially associated with health-related outcomes sex and academic classifications. However, the mechanism of these group differences could not be entirely explained. This study was also limited by a relatively small sample size conducted at a single institution in the southwestern United States, which limited the generalizability to sport club participants of other college campuses. Moreover, multiple analyses with MANOVAs and CCAs regarding sex and academic classification might inflate Type I errors that outweighed the advantages of using multivariate analyses. Despite the limitations, this study makes several major contributions in the field of recreational sports, based on Sweeney and Barcelona's (2012) recommendations. First, we have answered their call for more research on physical and emotional health due to the priorities on student health in recreational sports. This is in line with the NIRSA's strategic value of commitment to health and well-being (NIRSA, 2012). Second, we have expanded the body of empirical research in recreational sports, in which less than half of the published studies have used original or secondary data. Third, more than two-thirds of the original empirical research in the field were not based on explicit theoretical framework. In contrast, we used the well-established student involvement theory (Astin, 1984) to guide our research design and data analyses. Fourth, this study employed a rigorous methodology to study sport club participation. Using multivariate analyses (e.g., MANOVA, CCA) over univariate analyses (e.g., ANOVA, bivariate correlation) added statistical strengths and unique evidence to the current literature.

Beyond expanding the literature on sport club participation, the findings of this study also provide insights into practical strategies that address diverse students' needs in a large-sized public university. Considering all sport club participants, we found positive associations between sport club participation (quantity and quality) and health-related outcomes, which were primarily defined by sport club satisfaction, GPA, and subjective vitality. The findings imply that campus recreation professionals should focus on promoting the quality rather than quantity of student participation in sport clubs. This can be accomplished by assisting with the development and program structure of sport clubs, organization of competitions, and leadership training. With greater satisfaction of sport club participation, participants are likely to receive more benefits in academics and psychological well-being.

The group differences from our results suggest that campus recreation professionals should pay attention to the sex and academic classification of sport club participants in the program development and implementation. The relationships between sport club participation and health-related outcomes were stronger for males and freshmen than females and nonfreshmen, respectively. To increase female participants' recreation facility visits and sport club satisfaction for greater gender equity, campus recreation professionals may enhance the training opportunities, coaching opportunities, budget distribution, on- and off-campus publicity, and other support services among women's teams (Schneider et al., 2014). With regard to academic classifications, nonfreshmen had a lower frequency of recreation facility visit and lower GPAs than freshmen. It is recommended that campus recreation professionals may provide workshops for sophomore,

junior, and senior students to enhance their learning outcomes, such as time management and organizational skills. With support from recreational sports, all sport club participants are more likely to maintain a high level of involvement as well as academic performance and well-being.

Finally, the relatively high GPA and subjective vitality of sport club participants in this study further justify more resource allocation for collegiate sport clubs. This is also supported by the unique physical, intellectual, and social benefits of sport club programs over other recreational sports programs (Lower et al., 2013). It is our hope that the results and implications of this study will facilitate more research and practical strategies for promoting college students' sport club participation and corresponding health-related outcomes.

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