



Lane, D. C.; DeCamp, W. (2017). 'Sports will Keep 'em out of Trouble': A Comparative Analysis of Substance Use among Adolescents and Young Adults. *Journal of Sport and Health Research*. 9(1):41-52.

Original

“EL DEPORTE LOS MANTENDRÁ FUERA DE PROBLEMAS”: UN ANÁLISIS COMPARATIVO DEL USO DE SUSTANCIAS ENTRE ADOLESCENTES Y ADULTOS JÓVENES

‘SPORTS WILL KEEP ‘EM OUT OF TROUBLE’: A COMPARATIVE ANALYSIS OF SUBSTANCE USE AMONG ADOLESCENTS AND YOUNG ADULTS

Lane, David C.¹; DeCamp, Whitney²;

¹University of South Dakota

²Western Michigan University

Correspondence to:

David C. Lane

University of South Dakota

Dept. of Sociology, 414 East Clark St.

Vermillion, SD 57069

Tel. 605.677.7253

Email: dave.lane@usd.edu

*Edited by: D.A.A. Scientific Section
Martos (Spain)*



editor@journalsfhr.com

Received: 2/2/2016

Accepted: 1/6/2016



RESUMEN

Objetivo: El propósito de esta investigación fue examinar el uso de cigarrillo, alcohol, marihuana, esteroides y otras drogas en estudiantes secundarios y universitarios en el estado de Delaware, Estados Unidos. Este estudio se basa en investigaciones previas sobre uso de sustancias y participación deportiva.

Metodos: Los datos provienen de High School Youth Risk Behavior Survey (YRBS-HS) y del College Risk Behaviors Study (CRBS) y se usaron para comparar deportistas y no deportistas. En la muestra había 7.781 estudiantes secundarios de YRBS-HS y 4.019 estudiantes universitarios de CRBS.

Resultados. Los resultados indican que los participantes en deportes organizados a nivel universitario tienen una probabilidad significativa mayor de usar alcohol y de participar en eventos de consumo excesivo de alcohol que aquellos que no participan en deportes organizados, pero este efecto no fue encontrado en la mayoría de los grupos secundarios ni en el uso de otras sustancias. Los deportistas de nivel secundario tienen menos probabilidades de usar cigarrillo que sus compañeros deportistas.

Conclusion: Los resultados indican: primero, que los participantes en deportes organizados tienen una probabilidad mayor de beber alcohol y de participar en eventos de consumos excesivo al nivel secundario y universitario, especialmente los hombres que participan en deportes organizados a nivel universitario. Segundo, los esfuerzos de construir comparaciones grupales significativas, una práctica poco empleada en la examinación de las relaciones entre el deporte y el abuso de sustancias, revela una imagen más compleja sobre la relación entre el uso de sustancias y la participación en deportes organizados.

Palabras clave: Teoría de control, uso de sustancias, adolescencia, drogas, alcohol, comportamiento juvenil

ABSTRACT

Objective: The purpose of this research is to examine cigarette, alcohol, marijuana, steroids, and other drug use among high school and college students in the state of Delaware. This builds on previous research examining the dynamics of substance use and sports participation.

Methods: The data come from the Delaware High School Youth Risk Behavior Survey (YRBS-HS) and the College Risk Behaviors Study (CRBS), which are used to compare athletes and non-athletes. There were 7,781 high school students from the YRBS-HS and 4,019 college students from the CRBS in the sample.

Results: Findings indicate that participants in team sports at the college level are significantly more likely to use alcohol and engage in binge drinking when compared to those who do not participate in team sports, but this effect is not found in most pre-college grades and other substances use rates are similar. High school athletes are significantly less likely to use cigarettes when compared to their non-athlete peers.

Conclusion: These results suggest that those who participate in team sports are more likely to drink alcohol and engage in binge drinking at the high school and university level, especially males who participate in team sports at the university level. Second, efforts to construct meaningful comparison groups, a practice that has been underemployed when examining the relationship between sports participation and substance use, reveal a more complex picture about the relationship between substance use and participation in team sports.

Keywords: Substance Use; Bonding Theory; Adolescence; Drugs; Alcohol; Youth Behavior



INTRODUCTION

The relationship between substance use and athletic participation has been a subject of concern for many years (Buhrman, 1977; Hartmann and Massoglia, 2007; Marsh, 1993; Miller, et al., 2003; Shafer, 1969). It is not surprising that a body of literature has been established to explore the linkages between sports as form of a social activity that may be intervening factor affecting the rates of different forms of deviancy. Popular rhetoric depicts sports participation as an intervening variable reducing the potential for engaging in a number of undesirable activities, despite any conclusive evidence of this relationship (Harrop, 2011; Patterson, 2011). Historically, social science research has argued that athletic participation is associated with reduced rates of delinquency and substance use among high school boys (Shafer, 1969; Segrave, 1980). Proponents of this perspective claim that team sports cultivate youth in ways that prevent or reduce negative behaviors. However, a lack of research using comparison groups and appropriate measures of substance use has left this postulation largely unanswered. To date, researchers have found conflicting evidence about the correlation between substance use and sports participation (Eitle et al., 2003; Hartmann and Massoglia, 2007; Holland and Andre, 1987; Peretti-Watel, 2009). Moreover, even if sport participation is associated with reduced substance use, it may be correlated with an increase in the use of some substances, and a decrease of others (Cashmore, 2014).

Bonding theory (Hirschi, 1969) serves as the theoretical basis for this research. The foundation of this approach is that the internalization of social bonds, developed through socialization to social routines and activities, inhibits people from committing delinquent acts, hence conformity to conventional institutions. In this theory, participation in team sports is a form of activity associated with conventional institutions, which provides participants with structured social routines that occupy leisure time, ensuring their conformity to conventional institutions.

The majority of research employing bonding theory analyzes attachment to parents, school, or peers (Hirschi, 1969; Osgood and Anderson, 2006). This study shifts the focus to team sports as a form of

conventional activity, with participation in team sports as a measurement of a person's bonds. As Hirschi states (1969), "[t]he person involved in conventional activities is tied to appointments, deadlines, working hours, plans, and the like, so the opportunity to commit deviant acts rarely arises" (22). Organized activities are factors that limit the available time for deviant behavior to occur. It can be predicted that individuals who are participating in team sports will be less likely to engage in drug and alcohol use, as they have practices, games, ceremonies, and regular meetings.

A number of scholars have used Hirschi's bonding theory to discuss the participation in conventional activities (Bahr et al., 1998; Gardner and Shoemaker, 2005; Hoffman and Dufur, 2008). The problem with these approaches is that they examine the school participation, peer groups, religious groups or organizations, and the family as the conventional social institutions. Scholars have yet to focus on other conventional social activities or institutions, such as sports, which may promote strong bonds to conventional society. Participation in team sports is a unique measurement of involvement, as team sports are often associated with, organized, or sponsored by other institutions such as schools, community groups, or local governance.

Regulating Leisure

Some scholars find sports function to regulate leisure time, with a number of studies indicating that those who participate in sports are less likely to engage in delinquent acts (Agnew and Peterson, 1989; Buhrman, 1977; Schafer, 1969; Segrave, 1980). Adherents of this perspective argued that participation in team sports builds social solidarity through conformity (Agnew and Peterson, 1989; Schafer, 1969). The function of sports participation is to limit unmonitored times and spaces which provide opportunities for delinquency (Burman, 1977; Lander and Landers, 1977), and to allow for youth to 'burn off' their 'surplus energy' (Donnelly, 1981).

Studies in this perspective find that sports participation is associated with lower rates of delinquency for adolescents. For example, Agnew and Peterson (1989) examine the relationship between leisure and recreation activities, and delinquency among public high school students in Georgia, finding participation in non-competitive



sports and competitive sports is negatively associated with serious and minor delinquency. Schafer (1969) found that youth who participate in interscholastic athletics are less likely to be involved in the juvenile court system than their peers. Using longitudinal analysis Mahoney (2000) found that participation in extracurricular school activities was associated with a lower rate of arrest and dropouts among high school students.¹ All of these studies point to participation in sports and extracurricular activities as a factor that is associated with a reduction in adolescent delinquency. However, even Schafer (1969) stated that, while athletes are less likely to engage in delinquency, it may be that athletics attract a conforming type of personality or disposition. These studies suggest that sports serve a positive function by keeping youth out of trouble, or at least reducing the likelihood that they will become involved in delinquency. A major issue with these studies is they relied on dichotomous measures of delinquency, constructed from lifetime occurrences of different forms of delinquency, which does not fully capture the complexity of delinquent activities, including forms of substance use.

Contradictions and Quagmires

A second set of findings contends that there are minimal differences in substance use rates between athletes and non-athletes. These scholars claim that sports participation is likely not an intervening variable impacting substance use among adolescents and young adults (Eitle et al., 2003; Holland and Andre, 1987; Marsh, 1993; Osgood et al., 1996). Despite the popular conceptions of the benefits of playing sports these findings collectively assert that participation in athletics does not directly discourage substance use.

Marsh (1993) was unable to find significant differences between athlete and non-athletes regarding their delinquency. This research reduced delinquency to whether or not individuals 'get into trouble' or 'do not get into trouble', a constructed binary which obfuscates the types of delinquency or substance use that high school students may engage in. Similarly, Eitle et al. (2003) found that sports

participation was not a predictive factor that lowered an individual's involvement in substance use. This study reduced substance use into two categories: lifetime use of alcohol and a scale of lifetime use of 6 drugs (marijuana, cocaine, crack-cocaine, PCP, barbiturates, and amphetamines).

The variable construction of lifetime substance use overlooks two issues. First, different drugs may have different use rates among athletes and non-athletes respectively. Many youths may use substances, however by using a measurement of lifetime use those who are persistent users are included in the same category as one time experimenters and past users. Second, this measure of lifetime use does not account for dynamic sequences of experiences that are found among users.² It is widely established that people move in and out of substance use over time (Jackson-Jacobs, 2004; Schulenberg et al., 1994), including oscillations of many years (Adler, 1985), and that people are less likely to engage in criminal acts as they age out of the peak points in the age-crime curve (Sampson and Laub, 2005; Sampson and Laub, 1995). Thus, lifetime measurements would capture both current and former users as one and the same, potentially hiding true group differences in *current* behavior. However, if the effects do differ by drugs, combining them may hide the effects by shrinking group differences.

Segmented Effects of Sports Participation

Critics have found that participation in sports is associated with an increase in the use of some substances (Bacon and Russell, 2004; Eccles and Barber, 1999), noting that different sports and teams possess their own cultures and experiences for participants (Miller et al., 2003; Veliz et al., 2015a; Veliz et al., 2015b). A number of studies have found that male and female athletes were much more likely to consume alcohol and binge drink than their peer counterparts (Eccles and Barber, 1999; Miller et al., 2007; Miller et al., 2003). For example, Miller et al. (2003) not only found that high school athletes were much more likely than their peers to engage in alcohol use and abuse, but that they were also much more likely to be a problem drinker if they identified with

¹It is important to note that Mahoney's (2000) measurement included all extracurricular activities that a student may participate in, rather than only sports.

²For an extended discussion of the series of movements through the drug use experience see the body of literature on deviant careers and substance use (Adler, 1985; Becker, 1963; Luckenbill and Best, 1981).



the 'jock identity.' The difference in alcohol use and abuse rates may be accounted for by the norms that are associated with alcohol consumption among athletes (Coakley, 2007).

Other scholars contend that type of sport (Veliz et al., 2015a) and organizational context (Barry et al., 2015) are intervening variables affecting the likelihood of substance use. There are cultural differences in the sports experience, finding that those who participate in high contact sports (American football, lacrosse, ice hockey, and wrestling) are much more likely to use marijuana, alcohol, and binge drink compared to those who participate in semi-contact, and low contact sports (Veliz et al., 2015a; Veliz et al., 2015b). Similarly, Cavar and colleagues (2012) analyze the segmented effects of sports participation, noting that attachment to religion is a key intervening variable limiting the likelihood of substance use and misuse among female athletes.

Recently, a debate between scholars (Cashmore, 2014; Conner, 2009; Hemphill, 2009; Miller et al. 2002) emerged that questions whether conformity to sports by the athletes may result in the use of performance enhancing drugs to elevate their athletic ability (Petróczi, 2007). Although limited in scope, these findings indicate that some athletes adhere to the ideology of 'winning at all costs' by using performance enhancing drugs, supporting the hypothesis that athletes may have different cultural beliefs or values to become motivated offenders than non-athletes. Surprisingly, this research focuses specifically on athletes and doping, rather than the question of the relationship between sports participation and substance use, lacking appropriate comparison groups.

Only one recent study (Hartmann and Massoglia, 2007) examines the possibility that sports participation is correlated with both inhibiting and facilitating different forms of deviant behavior. This study, however, is a longitudinal analysis that posits high school sports participation will affect the likelihood of various forms of deviance (shoplifting, drinking and driving, fighting, given or sold alcohol to minors, and falsely called in sick to work) in adulthood. Although this research extends the analysis to account for both the positive and negative effects of sports participation, it fails to account for distinct differences in substance use among athletes

and non-athletes by measuring various different kinds of substance use. Yet, this study of 763 is limited in its generalizability, as 75% of the random sample was non-white, from St. Paul, Minnesota, and high school sports participants.

Aims

The history of contradictory findings demonstrates that the connection between sports participation and substance use is not clearly understood. The present study is intended to begin working in this direction by exploring patterns of substance use among high school students and young adults in Delaware. Team sports may have the potential to indoctrinate participants' sets of beliefs and values in a manner that may increase or decrease their likelihood of using certain substances. Strong bonds to team sports may also be associated with an increased acceptance of some forms of substance use and not others.

The overall research question for the present study is, "Is sports participation associated with lower or higher substance use prevalence rates among adolescents and young adults?" Studies have yet to fully examine the differences in the rate of use of a number of substances by athlete and non-athletes. As evidenced, existing measurements of substance use are misleading as they rely on lump sum categories that conceal the complexity of substance use among youth. This prevents research from examining differences between athletes and non-athletes along multiple dimensions of substance use.

METHODS

The data used in this study come from two distinct studies, both of which were approved by an Institutional Review Board. The first and primary dataset comes from the Delaware High School Youth Risk Behavior Survey (YRBS-HS). This survey is a biannual census of public and public-charter schools in the state of Delaware. Within each school, a random sample of 9th-12th grade classrooms are selected and surveyed. Each child present on the day of survey administration is asked to participate unless their parents have expressly requested otherwise (i.e., parental assent is acquired passively under the approved institutional review board protocol). To achieve a large enough sample, multiple years of YRBS-HS data (2005, 2007, and 2009) were used simultaneously. Overall, there were 7,920 students present on their respective classrooms' survey days.



Few students refused to participate or were asked to not participate by a parent, and 7,781 students (98%) participated.

The second dataset used here is the College Risk Behaviors Study (CRBS). The survey is conducted annually and is a random sample of University of Delaware full-time undergraduate students. This study utilizes the 2009, 2010, and 2011 CRBS data. The survey was conducted as an online web-based survey, with invitations sent to potential participants via email who were offered a \$5 credit to their ID cards for participating. Overall, 4,019 students participated, which is a 52% response rate.

To determine which students were athletes, YRBS participants were asked “During the past 12 months, on how many sports teams did you play? (Include any teams run by your school or community groups).” Responses were recoded for the present study simply as did or did not play on a sports team. CRBS participants were simply asked, “During the past 12 months, did you play on any sports teams? (Include both school and community teams).” Both of these questions lack a high degree of specificity, which has both advantages and disadvantages. On one hand, this does not allow an examination of only highly competitive sports. For example, a high school football team would be expected to be more highly competitive than a community co-ed kickball team. Additionally, they do not account for those who participate in lifestyle sports, such as surfing, which are often individualistic in orientation, a limitation of the survey instruments. On the other hand, however, this allows for a greater breadth of inclusion and is unlikely to exclude athletes from responding positively to the question. Among the high school participants, 55% reported participating in at least one sport. That proportion declined to 35% among the college student participants. These and other sample characteristics are displayed in Table 1. The table also includes a comparison to the population for age and gender, indicating that the samples are roughly representative of the populations on these measures.³

³ Ideally, additional independent/control variables would be eventually used. Unfortunately, the omnibus survey data used here do not include variables suitable for such

Table 1: Sample Characteristics[†]

	High School Sample	High School Population	College Sample	College Population
N	(7781)		(4019)	
Gender (%)				
Male	50.6	50.9	35.5	42.9
Female	49.4	49.1	64.5	57.1
Grade (%)				
Freshmen	27.9	30.4	18.4	20.2
Sophomores	26.8	25.8	24.8	26.3
Juniors	24.1	22.8	26.4	21.8
Seniors	20.9	21.0	30.3	31.7
Athlete (%)				
Yes	55.2	---	35.1	---
No	44.8	---	64.9	---

[†] Population statistics represent the final year used for the sample (i.e., 2009 for high school and 2011 for college)

Other variables used include various dichotomous indicators of substance use over a specific time period. Substances examined at the high school level include past month cigarette use, past month alcohol use, past month binge drinking (“5 or more drinks of alcohol in a row, that is, within a couple of hours”), past month marijuana use, past year steroid use (“taken steroid pills or shots without a doctor’s prescription”), and any other lifetime illegal drug use (any use of cocaine, heroin, methamphetamines, ecstasy, or non-prescribed prescription painkillers). At the college level, the same indicators are used, except that the college data do not include an indicator for steroid use because previous years indicated very low prevalence. Additionally, other illegal drug use is defined slightly differently for the college data (any use of cocaine, heroin, methamphetamines, non-prescribed prescription painkillers, or any other non-prescribed prescription drug).

Because the goal of this study is simply to determine whether athletes are significantly different from non-athletes in regard to substance use, analyses are proportion comparisons with chi-square difference tests. Some surveys were not fully completed, so data are missing for some cases. The analyses, being

purposes. Necessarily, then, the present study’s scope is limited to investigating an association between sports and substance use (i.e., a comparison of athletes to non-athletes). Further analyses on causality are beyond the scope of these data.



bivariate, allow for pairwise data exclusion. For the high school data, the inclusion rate varies from 94.6 to 95.3%, depending on the dependent variable being used. As with the high school data, not all cases include complete data for college students. The pairwise inclusion rate varies from 91.7 to 98.7% depending on the associated dependent variable. Data are analyzed with various subgroups to allow for more specific findings. In addition to examining individual grades to potentially indicate changing differences over time, the results will also be shown for gender-specific categories. Due to the lower sample size, the college student data are only further split by gender and not by class year.

RESULTS

The results for the overall samples are presented in Table 2. The most consistent finding is that athletes are less likely to use cigarettes. This difference is significant at each high school grade and for high school overall. Although the same difference can be observed at the college level, the difference is not significant. The results for alcohol and binge drinking are largely non-significant. At the high school level, 12th grade students are more likely to binge drink, but otherwise both athletes and non-athletes drink and binge drink at statistically equivalent rates. By college, however, the difference for general alcohol consumption has become statistically significant and the difference in binge drinking has widened. Marijuana use is consistently lower among athletes. Although this difference is not large enough to be significant for specific grades given the smaller sample size, the overall high school sample indicate this difference is significant. Surprisingly, steroid use is not related to athletic status, as the groups are not significantly different from each other and virtually identical overall. Finally, athletes are also less likely to use other illegal drugs, with the overall high school sample, as well as two specific grades, reporting lower use.

The results for males only are presented in Table 3. As with the overall sample, the results clearly support consistently lower cigarette use among athletes, with all specific grades and high school students overall reporting lower use. Once again, athletes and non-athletes are remarkably similar in alcohol use at the high school level, but athletes are more likely to drink and binge drink during college.

Table 2: Chi-Square of Substance Use by Athletic Status

	9th	10th	11th	12th	H.S. Avg.	College
N	(2125)	(2040)	(1836)	(1589)	(7781)	(4019)
Cigarettes (%)						
Non-Athlete	22.2	23.0	27.3	31.8	26.6	18.9
Athlete	16.4**	16.4**	20.6**	21.8**	18.5**	16.9
Alcohol (%)						
Non-Athlete	37.1	38.2	46.2	52.5	43.7	80.4
Athlete	39.2	42.5	47.6	57.2	45.5	83.3*
Binge (%)						
Non-Athlete	19.0	20.0	27.9	33.3	25.4	58.9
Athlete	21.2	22.4	30.3	38.1*	27.0	69.7**
Marijuana (%)						
Non-Athlete	20.7	22.6	28.6	32.8	26.6	15.5
Athlete	19.0	20.4	27.1	30.5	23.8**	15.3
Steroids (%)						
Non-Athlete	3.9	2.0	3.4	2.6	3.3	---
Athlete	2.6	3.5	3.5	4.3	3.5	---
Other Drugs (%)						
Non-Athlete	20.4	18.9	24.2	25.3	22.7	18.7
Athlete	16.5*	16.5	18.1**	22.3	18.0**	17.5

* p < .05

** p < .01

Among males, no significant differences emerge for marijuana or steroid use. Other illegal drug use, as before, was also less likely among athletes.

Table 3: Chi-Square of Substance Use by Athletic Status among Males

	9th	10th	11th	12th	H.S. Avg.	College
N	(2125)	(2040)	(1836)	(1589)	(7781)	(4019)
Cigarettes (%)						
Non-Athlete	24.7	23.7	31.5	31.3	28.1	25.3
Athlete	13.5**	16.9**	22.4**	21.5**	18.2**	23.1
Alcohol (%)						
Non-Athlete	36.2	35.6	48.5	52.7	43.3	78.3
Athlete	37.1	41.9	47.0	57.9	44.9	84.5**
Binge (%)						
Non-Athlete	19.3	21.5	34.8	37.6	28.3	62.6
Athlete	20.0	22.1	31.8	41.6	27.7	76.6**
Marijuana (%)						
Non-Athlete	22.7	25.7	34.0	34.7	29.1	22.5
Athlete	19.3	22.8	31.2	34.3	26.2	21.3
Steroids (%)						
Non-Athlete	3.9	2.2	4.2	4.6	3.9	---
Athlete	2.6	3.9	3.9	5.7	4.0	---
Other Drugs (%)						
Non-Athlete	19.0	17.1	23.7	27.1	22.0	22.6
Athlete	12.8**	17.6	19.6	24.0	17.9**	23.8

* p < .05

** p < .01

The results for females only are presented in Table 4. Although not as consistently significant as was for males, female athletes are also less likely to use cigarettes than female non-athletes. Unlike with males or overall, however, female athletes also benefited from this effect at the college level. General



alcohol use was not different between athletes and non-athletes, but binge drinking was higher among female athletes. Conversely, the full female-only high school and college samples indicate lower marijuana use among female athletes. As with previous findings, steroids did not seem to be related to athletic status, with other illegal drug use was generally lower among athletes.

Table 4: Chi-Square of Substance Use by Athletic Status among Females

	9th	10th	11th	12th	H.S. Avg.	College
N	(2125)	(2040)	(1836)	(1589)	(7781)	(4019)
Cigarettes (%)						
Non-Athlete	20.7	21.9	23.8	31.5	25.1	16.2
Athlete	19.2	15.9*	18.4	22.3**	18.6**	11.3**
Alcohol (%)						
Non-Athlete	37.4	40.1	43.8	51.9	43.6	81.2
Athlete	40.9	42.3	47.6	56.1	45.6	82.1
Binge (%)						
Non-Athlete	18.6	18.8	22.2	30.3	23.0	57.4
Athlete	22.8	22.4	27.8	33.6	25.9*	63.6**
Marijuana (%)						
Non-Athlete	19.0	19.6	24.5	31.5	24.2	12.7
Athlete	18.4	17.7	21.9	25.7	20.5**	9.7*
Steroids (%)						
Non-Athlete	4.0	1.8	2.5	1.3	2.7	---
Athlete	2.6	2.9	2.7	2.8	2.9	---
Other Drugs (%)						
Non-Athlete	21.6	20.3	24.6	23.8	23.0	17.2
Athlete	20.8	15.4	15.3**	20.4	18.1**	11.6**

* p < .05

** p < .01

Overall, these findings suggest that, in terms of substance use, the benefits of sport participation may outweigh the costs, especially prior to the college. Specifically, the higher rate of drinking is contrasted by the lower rates for cigarette, marijuana and other illegal drug use. Whether alcohol use and binge drinking are of less, equal or greater health risk than these other categories is a matter of actuarial analysis beyond the present study's scope, but the large differences in cigarette use and other drug use is at best convincing and at minimum a strong rebuttal to claims of high substance use among athletes. Tobacco use was significantly lower among athletes, and there were minimal differences between college athletes and non-athletes. Akin to the pattern that found among the comparison for other drugs, athletes overall and male athletes have similar rates of use. Female athletes, however, are less likely to use tobacco than their peers. Results in this study indicate that high school athletes and non-athletes use steroids

at low but similar rates. Despite much anecdotal and media concern otherwise, athletes were not significantly different for steroid use. This indicates that the risk of steroid use is not higher for athletes.

DISCUSSION

The purpose of this study was to further understand the relationship between substance use and sports participation. This study found that participation in team sports is correlated with a reduction in the use of some substances and an increase in the use of others. The current study has several strengths that advance the understanding of the relationship between substance use and sports participation.

First, this study constructed a measurement for different forms of substance use that allowed for meaningful comparisons to be drawn between participants in team sports and non-participants. Studies of substance use and sports participation traditionally included substance use within binary construction of adolescent delinquency, a variable that included many civil and criminal infractions (Mahoney, 2000; Schafer, 1969; Segrave, 1980). Further complicating this, studies which focused on substance use and sports participation used measurements of lifetime substance use (Eitle et al., 2003; Marsh, 1993). These measures overlook that different substances have different use rates among social groups (Johnston et al., 2012; Johnston et al., 2015) and that users often cycle in and out of substance use over time (Jackson-Jacobs, 2004; Schulenberg et al., 1994).

Findings from the current study are consistent with other research in the United States which shows that substance use rates differ the activities people participate in, their age, and the types of substances used. The current study was able to overcome the limitations of previous research (Mahoney, 2000; Eitle et al., 2003) by using measuring several different types of substance use in the previous 12 months. This finding offers support that different substance use may be couched in different kinds of sports experiences and cultures. It is consistent with research on the contextual nature of substance use and participation in team sports (Lisha and Sussmen, 2010; Miller et al., 2003; Vilez et al., 2015a).

Additionally, recent health concerns associated with early- and long-term tobacco use make youth tobacco



use an area of concern, and a contemporary social problem. This evidence suggests that athletic participation alone cannot explain the differences in use. The gendered component of being female and an athlete reduced both tobacco use and other drugs. This finding is congruent with research regarding the gendered component of alcohol use and sports participation (Lishna and Sussman, 2010; Miller et al., 2003; Sønderlund et al., 2014).

Second, the magnitude of this dataset allowed for a more thorough analysis. By incorporating YRBS-HS with CRBS data this research was able to draw findings from a robust sample. Specifically, the findings from the CRBS provide more depth and supporting evidence when used in conjunction with the YRBS-HS data. Findings are congruent with criminological research on the age-crime curve, which has consistently shown increases in illegal behavior, including substance use, beginning around age 16, and peaking around age 20 (Loeber, 2002; Sampson and Laub, 2005; Sampson and Laub, 1995).

Third, and most significantly, these findings advance bonding theory by applying this perspective to sports participation and substance use. According to Hirschi's (1969) initial conception, sports are an activity that should foster conformity and adherence to social conventions, fostering an environment where athletes are encouraged not to consume alcohol or other drugs. Contrary to this postulate, the findings in this study reveal participation in sports is not strongly correlated with a reduction in forms of substance use across the board. Moreover, those who participate in sports may be less likely to engage in certain forms of substance use, particularly other drugs and cigarettes, and be of greater risk to use alcohol and engage in risky patterns of consumption, such as binge drinking.

As evidenced, these results suggest that athletes are more likely to drink or binge drink at older ages, especially during college, in comparison to non-athletes of the same ages. Although this seems counterintuitive to Hirschi's (1969) bonding theory, this finding actually supports the initial thesis. In the culture of the United States, sports is closely associated with alcohol consumption, and a significant difference between athletes and non-athletes reveals that those who participate in sports are more likely to conform to the expectations of

alcohol consumption. They are bonding, in the sense that they are participating the routines and activities that are expected of them as participants in team sports.

Contemporary studies (Conner, 2009; Hemphill, 2009; Petróczi 2007) argue that athletes are especially prone to steroid use due as a result of socialization, conformity, and the pressures to 'win at all costs.' In other words, the bond to the conventional motivations of sports drives athletes to use unconventional methods to achieve success, emphasizing steroid use as a problem of athletic participation. However, the lack of significance between comparison groups reveals no differences in reported steroid use between athletes and non-athletes. These findings contradict studies which emphasize the use of steroids as a response to the pressures of 'winning at all costs' (Cashmore, 2014; Conner, 2009; Petróczi, 2007). The generally low rate of steroid use compared to alcohol, tobacco and marijuana further suggests that steroids are rarely used among both groups. Future research should examine the wider range of steroid use instead of focusing on athletes who use steroids and the wider range of performance enhancing drugs.

It must be noted, of course, that these findings are based on self-report data. It is possible that reports of substance use may not always be entirely truthful, though the anonymous nature of the surveys would suggest that such a bias is unlikely or minimal. It is possible there was response bias and credibility bias among athletes. However, the surveys were anonymous, and the questions were written in a non-bias manner to avoid pressuring respondents (Adler and Clark, 2003, 240-243; Creswell, 2003). Additionally, the high school data are Delaware-specific and the college data are even further tied to a specific institution. Generalization is not necessarily guaranteed and replication elsewhere would help to establish whether this effect is applicable outside Delaware.

There are two directions that future research in this area must undertake. First, future research needs to construct a valid measurement of time. A central component of Hirschi's (1969) discussion of involvement is the time component. Research needs to focus on time that is invested in bonding with conventional social groups. This will be useful in



demarcating those athletes who are strongly committed to sports or who are heavily involved, from the casual athletes who lack the serious time commitment to the bonding activity.

A second direction for future research is to expand on the types of delinquent activities in which athletes and non-athletes engage. Extending this approach to examine criminal activities and victimization will further illuminate the relationship between athletic participation and delinquency. This research should also extend toward crime in general. The purpose would be to examine the full spectrum of criminal activities to weight the benefits of participation in team sports instead of merging multiple forms of deviancy into index measurements or dichotomous variables. It is possible that there may be an association between athletic participation and other high risk behaviors between these two groups. Future research should explore the patterns of criminal behavior among these groups to fully understand the differences between athletes and non-athletes.

CONCLUSIONS

Despite popular rhetoric endorsing participation in team sports as a mechanism for reducing substance use, few studies have examined this claim with measures that account for the qualitative differences between substances and the contextual nature of substance use. Drawing on survey data from the YRBS-HS and CRBS, this research analyzed rates of alcohol, binge drinking, cigarettes, marijuana, steroids, and other drugs among high school students and university students in the state of Delaware. The primary conclusion to be drawn is that participation in team sports does not reduce the use of all substances, and it is associated with an increased use of alcohol and risky drinking behavior. Although sports may be a conventional activity that limits time for young adults to engage in substance use, participation in sports may open avenues for athletes to engage in different forms of substance use (e.g., binge drinking) in comparison to non-athletes.

ACKNOWLEDGEMENTS

The data used in this research were collected by the University of Delaware Center for Drug and Health Studies as part of studies supported by the Centers for Disease Control and Prevention, the Substance Abuse and Mental Health Services Administration Center for Substance Abuse Prevention, by the

Delaware Council on Gambling Problems, and by the Christiana Care Health Services Center for Women's and Children's Health Research. The views and conclusions expressed in this manuscript are those of the authors and do not necessarily represent those of the University of Delaware or the sponsoring agencies. The authors wish to thank Silvana Rosenfeld, Ph.D. for her assistance with translating parts of this manuscript, and the anonymous reviewers from the Journal of Sport and Health Research for their valuable feedback and insight.

REFERENCES

1. Adler, E. A.; Clark, R. (2003). *How it's Done: An invitation to social research* (2nd ed.). Belmont, CA: Wadsworth/Thompson Learning.
2. Adler, P. A. (1985). *Wheeling and Dealing: An ethnography of an upper level drug dealing and smuggling community* (2nd ed.). New York: Columbia University Press.
3. Agnew, R.; Peterson, D. M. (1989). Leisure and Delinquency. *Social Problems*. 36 (4): 332-350. doi: 10.2307/800819
4. Bahr, S. J.; Maughan, S. L.; Marcos, A. C.; Li, B. (1998). Family, Religiosity, and the Risk of Adolescent Drug Use. *Journal of Marriage and Family*. 60 (4): 979-992. doi: 10.1177/002204260803800305
5. Barry, A. E.; Howell, S. M.; Riplinger, A.; Piazza-Gardner, A. K. (2015). Alcohol Use among College Athletes: Do intercollegiate, club, or intramural, or student athletes drink differently? *Substance Use and Misuse*. 50 (3): 302-307. doi: 10.3109/10826084
6. Becker, H. S. (1963). *Outsiders: Studies in the sociology of deviance*. New York: Free Press.
7. Buhrman, H. G. (1977). Athletics and Deviance: An examination of the Relationship between athletic participation and deviant behavior of high school girls. *Review of Sport and Leisure*. 2: 17-35.
8. Cashmore, E. (2014). Sport's Doping Problem: A rational solution—allow drugs. *Substance Use and Misuse*. 49 (9): 1194-1197. doi: 10.3109/10826084.2014.904120
9. Cavar, M.; Sekulic, D.; Culjak, Z. (2012). Complex Interaction of Religiousness with other Factors in Relation to Substance Use and Misuse among Female Athletes. *Journal of Religion and*



- Health*. 51 (2): 381-389. doi: 10.1007/s10943-010-9360-9
10. Coakley, J. (2007). *Sports in Society: Issues and controversies* (9th edition). New York: McGraw Hill.
 11. Conner, J. M. (2009). Towards a Sociology of Drugs in Sport. *Sport in Society*. 12 (3): 327-343. Doi: 10.1080/17430430802673676
 12. Creswell, J. W. (2003). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches* (2nd ed.). Thousand Oaks, CA: Sage Publications.
 13. Donnelly, P. (1981). Athletes and Juvenile Delinquents: A comparative analysis based on a review of literature. *Adolescence*. 16 (62): 415-432.
 14. Eccles, J., S.; Barber, B. L. (1999). Student Council, volunteering, basketball, or marching band: What kind of extracurricular involvement matters? *Journal of Adolescent Research*. 14 (1): 10-43. doi: 10.1177/0743558499141003
 15. Eitle, D.; Turner, R., J.; Eitle, T. M. (2003). Deterrence Hypothesis Reexamined: Sports Participation and Substance Use among Young Adults. *The Journal of Drug Issues*. 33 (1): 193-221. doi: 10.1177/002204260303300108
 16. Eitle, T. M.; Eitle, D. J. (2002). Race, Cultural Capital, and the Educational Effects of Participation in Sports. *Sociology of Education*. 75 (2): 123-46. doi: 10.2307/3090288
 17. Gardner, L.; Shoemaker, D. J. (2005). Social Bonding and Delinquency: A comparative analysis. *The Sociological Quarterly*. 30 (3): 481-499. doi: 10.1111/j.1533-8525.1989.tb01532.x
 18. Harrop, F. (2011, March 23). Midnight basketball gets a bad rap? That's madness. *The Dallas Morning News*. pp. A15.
 19. Hartmann, D.; Massoglia, M. (2007). Reassessing the Relationship Between High School Sports Participation and Deviance: Evidence of enduring, bifurcated effects. *The Sociological Quarterly*. 48(3): 485-505. doi: 10.1111/j.1533-8525.2007.00086.x
 20. Hemphill, D. (2009). Performance enhancement and drug control in sport: ethical considerations. *Sport in Society*. 12 (3): 313-326. doi: 10.1080/17430430802673668
 21. Hirschi, T. (1969). *Causes of Delinquency*. New Brunswick, NJ: Transaction Publishers.
 22. Holland, A; Andre, T. (1987). Participation in Extracurricular Activities in Secondary School: What Is Known, What Needs to Be Known. *Review of Educational Research*. 57 (4): 437-466.
 23. Hoffman, J. P.; Dufur, M. J. (2008). Family and School Capital Effects on Delinquency: Substitutes or complements? *Sociological Perspectives*. 51 (1): 29-62. doi: 10.1525/sop.2008.51.1.29
 24. Jackson-Jacobs, C. (2004). Hard Drugs in a Soft Context: Managing Crack Use on a College Campus. *The Sociological Quarterly*. 45 (4): 835-856. Doi: 10.1111/j.1533-8525.2004.tb02316.x
 25. Johnston, L. D.; O'Malley, P. M.; Bachman, J. G.; Schulenberg, J. E. (2012). *Monitoring the Future national results on adolescent drug use: Overview of key findings, 2011*. Ann Arbor: Institute for Social Research, The University of Michigan.
 26. Johnston, L. D.; O'Malley, P. M.; Miech, R. A.; Bachman, J. G.; & Schulenberg, J. E. (2015). *Monitoring the Future national survey results on drug use: 1975-2014: Overview, key findings on adolescent drug use*. Ann Arbor: Institute for Social Research, The University of Michigan.
 27. Landers, D. M.; Landers, D. M. (1977). Socialization via Interscholastic Athletics: Its effect on delinquency. *Sociology of Education*. 51 (4): 299-303.
 28. Lisha, N. E.; Sussman, S. (2010). Relationship of high school and college sports participation with alcohol, tobacco, and illicit drug use: A review. *Addictive Behaviors*. 35 (5): 399-407. doi: 10.1016/j.addbeh.2009.12.032
 29. Loeber, R.; Menting, B.; Lyman, D. R., Moffitt, T. E., Stouthamer-Loeber, M.; Stallings, R.; Farrington, D. P.; Pardini, D. (2012). Findings From the Pittsburgh Youth Study: Cognitive impulsivity and intelligence and predictors of the age-crime curve. *Journal of the American Academy of Child and Adolescent Psychiatry*. 51 (11): 1136-1149. Doi: 10.1016/j.jaac.2012.08.019
 30. Luckenbill D. F.; Best, J. (1981). Careers in Deviance and Respectability: The analogy's limitations. *Social Problems*. 29 (2): 197-206. doi: 10.2307/800424



31. Mahoney, J. L. (2000). School Extracurricular Activity Participation as a Moderator in the Development of Antisocial Patterns. *Child Development*. 71 (2): 502-516. doi: 10.1111/1467-8624.00160
32. Marsh, H. W. (1993). The Effects of Participation in Sport During the Last Two Years of High School. *Sociology of Sport Journal*. 10: 18-43.
33. Miller, K. E.; Barnes, G. M.; Sabo, D. F.; Melnick, M. J.; Farrell, M. P. (2002). Anabolic-Androgenic Steroid Use and Other Adolescent Problem Behaviors: Rethinking the male athlete assumption. *Sociological Perspectives*. 45 (4): 467-489. doi: 10.1525/sop.2002.45.4.467
34. Miller, K. E.; Hoffman, J. H.; Barnes, G. M.; Farrell, M. P.; Sabo, D.; Melnick, M. J.. (2003). Jocks Gender, Race, and Adolescent Problem Drinking. *Journal of Drug Education*. 33 (4): 445-462. doi: 10.2190/XPV5-JD5L-RYLK-UMJA
35. Miller, K.E.; Melnick, M. J.; Barnes, G. M.; Sabo, D.; Farrell, M. P. (2007). Athletic involvement and Adolescent Delinquency. *Journal of Youth Adolescence*. 36 (5): 711-723. doi: 10.1007/s10964-006-9123-9
36. Osgood, D. W.; Anderson, A. L. (2006). Unstructured Socializing and Rates of Delinquency. *Criminology*. 42 (3): 519-549. doi: 10.1111/j.1745-9125.2004.tb00528.x
37. Osgood D. W.; Wilson, J. K.; O'Malley, P. M.; Bachman, J. G.; Johnston, L. D.. (1996). Routine activities and individual deviant behavior. *American Sociological Review*. 61 (4): 635-655. doi: 10.2307/2096397
38. Patterson, M. (2011 August 17). Midnight basketball for youth is predicted to be a huge success. *The Daily Examiner*. pp. 4.
39. Peretti-Watel, P. (2009). Sports and Drugs: Further interpretative hypotheses are necessary. *Addiction*. 104 (1): 150-151. doi: 10.1111/j.1360-0443.2008.02464.x
40. Petróczi, A. (2007). Attitudes and Doping: A structural equation analysis of the relationship between athletes' attitudes, sport orientation and doping behavior. *Substance Abuse Treatment, Treatment, and Policy*. 2: 34-49. doi: 10.1186/1747-597X-2-34
41. Sampson, R. J.; Laub, J. H. (2005). A Life-Course View of the Development of Crime. *Annals of the American Academy of the Political and Social Science*. 602: 12-45. doi: 10.1177/0002716205280075
42. Sampson, R. J.; Laub, J. H. (1995). *Crime in the making: Pathways and turning points through life*. Cambridge, MA: Harvard University Press.
43. Schafer, W. E. (1969). Participation in interscholastic athletics and delinquency: A preliminary study. *Social Problems*. 17 (1): 40-47. doi: 10.2307/799891
44. Schulenberg, J.; Bachman, J. G.; O'Malley, P. M.; Johnston, L. D. (1994). High School Educational Success and Subsequent Substance Use: A panel analysis following adolescents into young adulthood. *Journal of Health and Social Behavior*. 35 (1): 45-62.
45. Segrave, J. O. (1980). Delinquency and Athletics: Review and reformulation. *Journal of Sport Psychology*. 2 (2): 82-89.
46. Sønderlund, A. L.; O'Brien, K. O.; Kremer, P.; Rowland, B.; De Groot, F.; Staiger, P.; Zinkiewicz, L.; Miller, P. G. (2014). The Association Between Sports Participation, Alcohol Use and Aggression and Violence: A systematic review. *Journal of Science and Medicine in Sport*. 17 (1): 2-7. doi: 10.1016/j.jsams.2013.03.011
47. Veliz, P.; Schulenberg, J.; Partick, M.; Kloska, D.; McCabe, S. E.; Zarrett, N. (2015a). Competitive sports participation in high school and subsequent substance use in young adulthood: Assessing differences based on level of contact. *International Review for the Sociology of Sport*. doi: 10.1177/1012690215586998
48. Veliz, P. T.; Boyd, C. J.; S. E. McCabe. (2015b). Competitive Sport Involvement and Substance Use among Adolescents: A nationwide study. *Substance Use and Misuse* 50 (2): 156-165. doi: 10.3109/10826084.2014.962049