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THE IMPACT OF PARTICIPATION IN SPORTS ON SUBSTANCE USE DURING
ADOLESCENCE

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Abstract

Are adolescents who participate in sports less likely to use substances like drugs and alcohol? Prior work done on this topic finds conflicting results suggesting that there can be both positive and negative impacts of sports participation on substance use. The research done in this thesis looks to contribute additional insights by examining the question in a large sample of middle- and high-school students in the United States. By utilizing previous research and theories, a hypothesis is laid out anticipating that participation in organized sports leads to a decrease in alcohol and drug use. This thesis looks at this topic through those involved in organized sports because previous research shows this kind of sporting activity to be the most beneficial to adolescents. Through statistical analysis on data from the 2018 Monitoring the Future Study this thesis can provide a more comprehensive assessment of the relationship between participation in sports and drug and alcohol use. The results show that participation in sports significantly reduces alcohol use but not other drug use. Additionally, the study reveals that involvement in organized sports affects youth alcohol consumption by altering their rate of unstructured socializing, which reflects the amount of time spent with peers in unsupervised settings. Overall, the study indicates that sports participation reduces unstructured socializing, which in turn leads to less frequent alcohol use. These studies give us meaningful results that can be applied to larger topics of substance use and delinquency.

Table of Contents

Abstract.....	i.
Table of Contents.....	ii.
List of Tables and Figures.....	iii.
Chapter 1: Introduction	1.
Chapter 2: Literature Review and Hypotheses.....	5.
Chapter 3: Methodology.....	11.
Chapter 4: Results.....	17.
Chapter 5: Discussion.....	27.
Chapter 6: Conclusion.....	30.
References.....	31.

List of Tables and Figures

Table 1 Variable Definitions	16.
Table 2 Descriptive Statistics.....	17.
Figure 1 Drug Use Bivariate Regression Model	19.
Figure 2 Alcohol Bivariate Regression Model.....	19.
Table 3 Drug Use Multivariate regression table.....	22.
Figure 3 Drug Use Multivariate Regression Model.....	23.
Table 4 Alcohol Use Multivariate Regression Table	24.
Figure 4 Alcohol Use Multivariate RegressionModel.....	25.
Figure 5 Unstructured Socializing Multivariate Regression Model.....	26.

I. Introduction

In a person's adolescence they learn about the world, what their interests are, and begin to shape their overall identity. It is at this critical time in life where people should receive close attention to facilitate efforts that may prevent them from making harmful decisions for their future. Too often adolescents participate in substance use and other delinquent behaviors that have detrimental effects not only during their youth, but also in their future. For my thesis I'm exploring the topic of the effects of sports participation on substance use, specifically alcohol and other drug use. Looking at different behaviors and habits, like playing sports and their relationship to substance use, has immense value. Sports provide characteristics that could influence substance use and other forms of negative behavior. Substance use is an issue that is widespread in our society, with many different interpretations and beliefs on causes and treatments. In order to understand this issue and help adolescents achieve their greatest potential, all options of treatment should be explored. This topic is important for Criminology because it can identify a potential approach that may help to decrease substance use in young people. Throughout this paper I plan to examine and respond to several different research questions. These questions are as follows: In what way does organized sports participation affect alcohol use during adolescence? In what way does organized sports participation affect other drug use such as marijuana, psychedelics, and tranquilizers during adolescence? And, does any observed relationship between sports participation and substance use arise due to the ways in which sports alter the nature and setting of peer socialization?

Researching and responding to these questions can provide us with answers that can create change in society and help a lot of people. By looking at the relationship between sports participation and substance use we can start to put in place policies that emphasize the importance of sports and the positive effects it has on adolescents.

Previous research suggests that sports participation can relate to use of drugs and alcohol in both good and bad ways. Results vary from study to study with a lot of disagreement between researchers and their findings. Alcohol use is the most strongly associated with having a positive correlation with sports involvement (Halldorsson, Thorlindsson, and Sigfusdottir, 2014). However, when examined under the right circumstances, sports can be seen deterring this type of behavior, as some studies suggest that substance use is less common in adolescents who participated in sports. With these variables there still were studies that determined a causal relationship between sports participation and them. Overall, the research is inconclusive, and the true effects of sports participation are not yet clear. Additional research, with larger and more representative samples, is needed to add to existing knowledge.

Theoretical arguments on what the results of the research will be, can be made for both sides. First there is the argument that sports participation increases substance use in adolescents. This perspective utilizes differential association theory to explain that behaviors like drug use and drinking are learned through being around and observing other people, such as peers and teammates who use substances. The opposite perspective can be backed with theories like social learning theory and social bond theory. Through the lens of social learning theory participants on a sports team are likely to learn beliefs and be exposed to behavioral role modeling that does not support substance use, and instead values discipline, pro-social health practices, and a focus on improving mentally and physically to maximize performance in the given sport. Social bond

theory supports the idea that sports participation can lead to stronger bonds with teammates and coaches that ultimately can cause an adolescent to improve their overall behavior. Both arguments use theories that can explain logical reasons for what the results of this research should look like.

I will address my research questions through research from eighth and tenth graders in the Monitoring the Future Study. This is a study that surveys middle school and high school age students on a number of different topics. I will be applying this survey to my topic, with my sample including 7,527 participants who are representative of similarly aged youth from the 48 contiguous states. My independent variables will be looking at whether or not individuals participated in organized sports over the last twelve months. My dependent variable will be measured by the frequency of alcohol use during the past twelve months, and the frequency of other drug use (i.e., marijuana use, LSD, psychedelics, and sedatives). Utilizing quantitative statistical techniques, and applying them to the data collected I can come to conclusions that will answer my research questions.

Throughout the remainder of the thesis, I will review prior research and theories, describe the methodology and results, and discuss the implications of the findings and the conclusions that emerge from the study. In chapter 2, I will explore existing research and theories that discuss potential outcomes of this study. Based on this information I will then describe my hypothesized expectations about the core research questions. Chapter 3, the methodology section, explains the method of data collection and statistical analysis. Chapter 4, the results, discusses the findings from that statistical analysis. Then we move to Chapter 5 where I discuss what we can make of these results and how they can be applied to the larger scope of Criminology and the world.

Lastly, Chapter 6 will conclude the thesis and summarize our findings and the relevance of the work.

II. Literature Review and Hypotheses

This thesis will examine and look to identify relationships between sport participation and substance use. This will be done by dividing substance use into two categories: alcohol use in adolescence and other drug use in adolescence. Based on this I will do quantitative statistical analysis to address my research questions: These questions are as follows: In what way does organized sports participation affect alcohol use during adolescence? In what way does organized sports participation affect other drug use such as marijuana, psychedelics, and tranquilizers during adolescence? And, does any observed relationship between sports participation and substance use arise due to the ways in which sports alter the nature and setting of peer socialization?

Theoretical background and existing evidence

Before doing my own research, it is important to look at possible theories to help explain why participation in sports could impact alcohol use and other drug use. The first theory that can help explain the relationship between sports and substance use is differential association theory, developed by Edwin Sutherland in the first decades of the twentieth century. Differential association theory is the idea that individuals pick up on criminal behavior, attitudes, and beliefs through interactions and communication with a group (Matsueda, 2000). This theory can be directly applied to an individual's participation in sports and their use of drugs and alcohol. Substance use in any form is detrimental to an athlete's performance, health, and overall future. Despite that there have been instances where substance use is more common in those who participate in sports. This is due to team's having an environment where peers bond, partake in similar behaviors and even pressure others into participating in illegal activities. If an individual

is a part of a team where drinking alcohol or doing drugs is common and accepted as part of the group culture, they may be more prone to participating in that type of behavior. Like differential association theory discusses, people can pick up these illicit behaviors and develop favorable perspectives on drugs from an intimate group, like a sports team. When looking at alcohol use specifically, this trend is more common, especially with older personnel (Halldorsson et. al, 2014). It's in these instances where individuals observe other team members drinking alcohol and feel it is acceptable and fine to do, even as an athlete.

Another important theory to help explain the relationship between these two variables is social learning theory. Social learning theory posits that people learn behavior through a process of observing and being around others (Pratt et al., 2009). This theory builds off what differential association theory previously discussed. Social learning theory originally theorized by Ronald Akers (Cullen et. al, 2010) suggests that behavior can be imitated, and that this is pertinent not only for whether individuals participate in criminal behavior but also whether they engage in pro-social behaviors. Beyond role modeling, Akers (Cullen et. al, 2010) also emphasizes the importance of the values and messages to which youth are exposed. On the one hand, there is the idea that delinquent behavior can be learned and interpreted as acceptable from one's peers, but on the other hand the opposite can be true where this behavior is seen as dangerous and a more disciplined approach to behavior is more common. This theory can be applied like previously discussed where an individual may see someone else on their team drinking, so therefore they do the same thing. It can also be used to support research behind sports participation and a negative correlation with substance use. If no one uses drugs and there is a general negative perspective on drugs due to its effects on the team and performance in the sport, it is going to be less likely for members on the team to partake in that type of behavior.

Results from studies have shown participation in sports to have a more beneficial result for other drug use compared to drinking alcohol, particularly in young adults (Nadra & Sussman, 2010). Through these different findings it is clear that a relationship between sports and substance use is often observed. Sports allows people to bond with their peers, participate in physical activities, and learn new skills. People are greatly influenced by the lessons they learn, the friends they make, and the role models they gain from sports. Using alcohol and other drugs at a young age can have lasting effects on a person's life. By being active in sports an adolescent can put more focus and effort into the task the sport presents and spend less time in situations that put them at risk of these behaviors. Sports can have a positive impact on so many people, and under the right conditions prevent adolescents from making poor decisions.

The last theory that relates to the research questions addressed in this thesis is social bond theory. Social bond theory posits that a person with stronger bonds to traditional society will be less likely to participate in delinquent behavior (Chriss, 2016). Stronger bonds to teammates, and role models like coaches can help an individual make better decisions and stray away from delinquent behavior. The benefits previously discussed like learning life lessons, creating lasting relationships, and avoiding bad decisions can be directly affected by the strength of an individual's bonds to the team. This theory is why I believe we must consider specific variables like frequency, organization, and oversight when looking at this topic. Organized sports teams, with dedicated coaches, and consistent weekly time create stronger societal bonds that will have a greater benefit on a person's life. There is also the simple reality that the stronger someone's bonds are to traditional people and activities the more time they will spend doing those activities with those people. Sports participation cannot be defined as all those that play some sport. Participation in organized sports is fundamentally different than engaging in occasional episodes

of unorganized sporting activities (Halldorsson et. al, 2014). The frequency and regularity in which a person participates in sports is likely to be more impactful on their likelihood of substance use. The more someone participates in organized sports, the less time they will have to take part in unsupervised, and potential bad activities. Age is also a major factor in someone's likelihood of alcohol and other drug use. The older that members of a team are, it is likely that there will be an increase in them using these substances. It's key when examining this topic that all variables are considered and that we are clear in defining sports participation, substance use, and the different variables that can affect research and discoveries.

Prior research on this topic points to results that can lead to both a decrease and increase in alcohol and other drug use when adolescents participate in sports. It is important to evaluate both outcomes and look to distinguish differences between these studies before establishing hypotheses. Pinpointing these key details can help to better understand what has previously been done and how it applies to the research in this thesis.

Multiple studies have found certain conditions and aspects of participating in sports to result in substance use, particularly alcohol use. In several studies, participation in sport with a lack of organization and supervision leads to a positive relationship with alcohol use (Halldorsson, Thorlindsson, and Sigfusdottir, 2014). The culture of a team, especially as people get older, can lean towards embracing drinking, even including it as a normal activity. While the research supporting sports participation as increasing alcohol use, there is a lot less research to support that it increases other drug use (Lisha and Sussman, 2010). Studies point to sports having a more beneficial influence on players' risk of these types of behaviors. However, there is still research that points to certain types of sports leading to negative effects on adolescents like substance use. Maume and Parrish (2021) found that heavy contact sports in adolescents can lead

to an increased risk of drug use. Despite opposing research and findings, under the right conditions there can be a positive correlation between substance use and sports participation in adolescence.

Numerous studies have explored similar research questions and found sports participation to lead to a decrease in substance use. Participation in formal sports that regularly compete and are a part of the community, is negatively associated with alcohol use in adolescence (Halldorsson, Thorlindsson, Sigfusdottir, 2014). While there are studies that show a negative correlation between these two variables, alcohol is by far the most strongly positively correlated with sports participation of the dependent variables being examined. On the other hand, in many studies drug use was less likely when adolescents participated in sports. One systematic review that examined seventeen different studies found that 80% of them had these results (Kwan et. al, 2014). Overall, when researched under the right conditions we can see the benefits of participation in sports.

The literature greatly conflicts itself making it intriguing to look at this topic more closely. It's imperative to act carefully when researching to look at determining factors like gender, race, community, home life, and previous behavioral issues. Sports are widely a part of young people's lives across the country. The potential physical, social, and mental benefits are vast. With the popularity of sports it is essential to identify the true effects it has on substance use, and what conditions set a young athlete up for the most success in the future. Looking at what the prior research shows and the availability of the study, participation in sports looks only at organized sports, as it has proven to have the most positive results in past research.

Hypotheses

Based on extant theory and prior research I am able to look at my different research questions and hypothesize what I will find in my research and how those questions will be answered. Specifically, I hypothesize that if an individual in their adolescence participates in organized sports, then they will be less likely to drink alcohol and use other drugs. This hypothesis is backed by previous theoretical and research work done on the topic. Additionally, I hypothesize that youth sports participation will reduce substance use by decreasing the frequency of unstructured socializing among youth. This is likely the case because sports teams offer more structured opportunities for youth socialization and less support and time for youth to spend time in other, less structured, settings that may be conducive to substance use.

III. Methodology

Data

The data being analyzed for this research comes from the Monitoring the Future (MTF) study. This is a survey done on the youth of America annually by the University of Michigan Institute for Social Research. The study that will be looked at specifically is from 2018 and includes a number of various categories and questions to help us better understand different aspects of the youth in America. With thousands of students being sampled from hundreds of different schools across the country the survey is able to successfully represent the larger population of the 8th and 10th graders in the United States. The main limitations to this study and representing the population is through people in the study who dropout or are not at school on the day of the survey. These people are unable to participate and can therefore influence the results. However, this matter is less of a concern among 8th and 10th graders, whose drop out rates tend to be very low. Overall, the study is able to take the necessary steps to gather accurate, and valuable data that can be used to research countless different topics of this population.

Explanatory Variable

This research is aimed at seeing the effects of sports participation on substance use in adolescents. To answer this question the explanatory variable must have a clear definition and measurement. For the purpose of the study sports participation will be looked at specifically as participation in organized sports. Based on previous research this is the most effective kind of participation in sports, therefore is the worthiest of examinations. The explanatory variable is participation in sports and will be used interchangeably with participation in organized sports. Regardless of what term is used when discussing the research and results, they both refer to

participation in organized sports. This variable is defined as participating in any kind of competitive and organized sport over the past 12 months. Participants of the survey answered this question with either 0=No or 1=Yes. By gathering this data from the study, a clear difference can be made in identifying how people's responses to this variable directly correlates to other variables in the study.

Dependent Variables

The dependent variables drug use and alcohol use are utilized to determine the effects of participation in organized sports on substance use. Drug use is defined as the frequency of drug use in the past twelve months. To encompass drug use most pertinent to 8th and 10th graders, the study focused on the questions that ask participants about their use of marijuana, LSD, other psychedelics, and tranquilizers. By combining the respondents' answers, a standardized index that ranged from 0-4 was created to represent the responses. A higher number on the index indicated more frequent drug use and a lower value represents less frequent drug use. The other dependent variable, alcohol use, is defined as the frequency of alcohol consumption over the past 12 months. Participants were given a number scale to indicate how many occasions they consumed alcoholic beverages over the past 12 months (1=0, 2=1-2x, 3= 3-5x, 4=6-9x, 5=10-19x, 6=20-39x, 7=40+x). Higher values indicate more frequent use of alcohol. Clearly defining these variables and collecting data on them allows the analysis of the relationship with the explanatory variable, as well as other control variables, and eventually gives results that answer the research questions.

Control Variables

Substance use can be impacted by a number of different factors in an individual's life, and many of those factors also may be associated with participation in organized sports. In order to get the most accurate results and isolate the influence of sports participation, the study incorporated several control variables. First individual factors need to be examined and controlled to garner accurate results. These variables include grade level (0=8th, 1=10th), race and ethnicity (1=non-Latino White, 2=black, 3=Hispanic, 4=unknown), as well as sex (0=female, 1= male, 2=unknown).

Multiple variables regarding individuals' relationship with school are also included. These variables included whether or not a person's been held back (0=no, 1= yes), if they have been suspended (0=no, 1= yes), number of times they have cut class (standardize index), if they expect to finish college (0=no, 1= yes), if they have any friends who dropped out (1=none, 2=a few, 3=some, 4= most/all), and the highest level of education either their mother or father reached (1=grade school, 2=some high school, 3=high school graduate, 4=some college, 5=college graduate, 6=graduate school). Perception of school and experience with school can influence someone's behavior greatly, so it is important to control these variables when trying to isolate the effects of sports participation on substance use.

The study also includes several other variables that have been linked to individual differences in substance use. This includes youth perceptions of the risk of drug use, which is measured on a standardized index and measures the perceived risk of alcohol and drug use. Another one is community type, which compares youth from communities of different sizes based on Metropolitan Statistical Area definitions (0= non MSA, 1= MSA, 2= Large MSA). Two parent household is also a control variable that considers if individuals have both parents living

in the same house (0= no, 1= yes). Additional control variables consider how time is spent outside of school, including youth participation in work (0=none/no job, 1=work less than 15 hrs, 2= work more than 15 hrs), the daily average amount of hours spent on a gaming device (1=none, 2= <1, 3=1-2, 4= 3-4, 5= 5-6, 6= 7-8, 7= >8), and the amount of time participating in text/calling on phone, video chat, social media apps, and watching videos (i.e., digital media exposure), and the average daily time (in hours) spent by yourself without supervision after school(1=none, 2= <1, 3=1-2, 4=2-3, 5=4-5, 6= >5). These and other variables are defined in greater detail below in Table 1.

Potential Mediating Variable

As conveyed in the theoretical discussion above, one reason sports participation may influence substance use among youth is by altering their patterns of socializing with peers in unstructured settings that may be conducive to alcohol and drug use. To assess that possibility, the study included a measure of unstructured socializing, which captures individual differences in the time youth spend going on dates, movies, car rides, parties with friends, and activities without parents in a standardized index, where higher values indicate that youth spend more time with peers in unstructured settings. This variable gives us a clear insight into how adolescents are spending their free time, and how structured that time is.

Method of Analyzing Data:

After presenting descriptive information about the sample examined, to analyze the data and gather accurate results the first step will be a bivariate regression assessment between the explanatory variable participation in organized sports and the dependent variables drug use and

alcohol use. This analysis will provide results of any significant relationship between the explanatory variable and dependent variables. To prevent potential false results impacted by confounding variables the next step will be a multivariate regression assessment on both alcohol use and drug use in comparison to participation in organized sports. This type of quantitative technique controls for the confounding variable to ensure that they are not the ones creating the results from the bivariate regression analysis. Once these different types of techniques are used, the results can be analyzed to find significant findings and potential causes. A last step is to integrate the measure of unstructured socializing to see if it helps to explain any observed relationship between sports participation and substance use.

Table 1. Definitions and Metrics for Variables

Variable	Variable Definition
Dependent Variables	
Drug Use	Frequency of drug use (i.e.,) in the past 12 months
Alcohol Use	Frequency of alcohol consumption in the past 12 months
Explanatory Variable	
Participation in Organized Sports	Participating in any kind of competitive, organized sport in the past 12 months (0=no, 1=yes).
Control Variables	
Sex	Binary indicator of respondent's sex (0=female, 1=male, 2=unknown).
Race-Ethnicity	Four binary variables indicating race of respondent (0=no, 1=yes) (Non-Latino white, non-Latino black, Hispanic, other)
Digital Media	Number of hours participating in text/calling on phone, video chat, social media apps, and watching videos
Hours Gaming	Number of hours per day spent on a gaming device. (1=none, 2=<1, 3=1-2, 4=3-4, 5=5-6, 6=7-8, 7=>8)
Community Type	Size of Community based on Metropolitan Statistical Area definitions (0=non MSA, 1=MSA, 2=Large MSA)
Grade	Grade Level (8= 8th Grade, 10= 10th Grade)
Maximum Parental Education	Highest level of Education experienced by a mother or father (1=grade school, 2=some high school, 3=high school graduate, 4=some college, 5=college graduate, 6=graduate school)
Two Parent Household	Having both parents living in the same house (0= no, 1= yes) (Full-time, Part-Time, Unemployed, Not Participating in Labor Force)
Cutting Class	Index of number of times cutting or skipping class
Dropout Friends	Number of friends who dropped out of high school (1=none, 2=a few, 3=some, 4=most/all).
Held back	Being held back a grade in school (0=no, 1= yes)
Suspended	Receiving a suspension in school (0=no, 1= yes).
College Expectations	Expected to finish college in the future (0=no, 1= yes).
Work	Working a job and amount of time spent working (0=none/no job, 1=work less than 15hrs, 2= work more than 15hrs)
Alone after School	Average daily time spent by yourself without supervision after school (1=none, 2=<1, 3=1-2, 4=2-3, 5=4-5, 6=>5)
Risk of Drug Use	Index of perceived Risk of Alcohol and Marijuana Use
Unstructured Socializing	Social Interactions done in an unorganized Setting (dates, movies, car rides, party with friends, and out without parents).

IV. Results

Descriptive Statistics

Table 2. Descriptive statistics (n=7,527)

Variable	Standard			
	Mean/%	Deviation	Minimum	Maximum
Dependent Variables				
Drug Use	0.242	0.554	0	4
Alcohol Use	1.589	1.187	1	7
Explanatory Variable				
Participation in Organized Sports	25.20%	0.434	0	1
Control Variables				
Sex (1=male)	48.30%	0.50	0	1
Race-Ethnicity				
White	49.20%	0.50	0	1
Black	10.80%	0.31	0	1
Hispanic	20.50%	0.40	0	1
Unknown	19.50%	0.40	0	1
Digital Media	-0.007	0.71	-1.392	2.682
Hours Gaming	3.68	1.625	1	7
Community Type				
Non-MSA	21.60%	0.411	0	1
MSA	43.10%	0.495	0	1
Large- MSA	35.20%	0.478	0	1
Grade (10th)	53.00%	0.499	0	1
Maximum Parental Education	5.00	1.512	1	7
Two Parent Household	75.00%	0.433	0	1
Cutting Class	-0.006	0.823	-0.307	7.353
Dropout Friends	1.236	0.488	1	4
Held back	8.10%	0.273	0	1
Suspended	19.30%	0.395	0	1
College Expectations	55.60%	0.497	0	1
Work				
Does not...	77.50%	0.418	0	1
Works less than 15hrs...	17.20%	0.378	0	1
Works more than 15hrs...	5.30%	0.224	0	1
Alone after School	2.731	1.465	1	6
Risk of Drug Use	-0.005	0.845	-1.315	4.076
Unstructured Socializing	-0.00009	0.589	-1.478	3.157

Table 2 presents statistics that describe the study sample. The table shows that the sample consists of 7,527 individuals. Of these participants we can see that 25.20% of people in the sample participated in sports. Additionally, table 2 displays the means of both dependent variables (.242 for drug use, and 1.589 for alcohol use), and the associated standard deviations indicate substantial variation in these behaviors across sample members. An important focus of the study is whether that variation is related to participation in organized sports. Table 2 also shows a variety of other details about the sample, which is approximately 48 percent male and includes youth from each major racial-ethnic group in the nation and a mix from different types of communities.

As an initial assessment of whether participation in organized sports is associated with substance use, bivariate regression models were estimated, and the predicted levels of drug use and alcohol use were computed for sports participants and non-participants. The results of these estimations are summarized in figures 1 and 2.

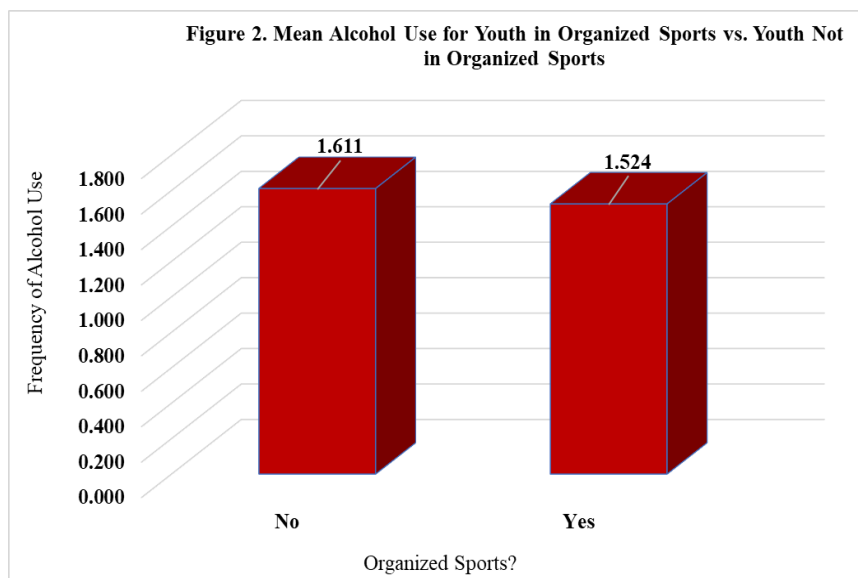
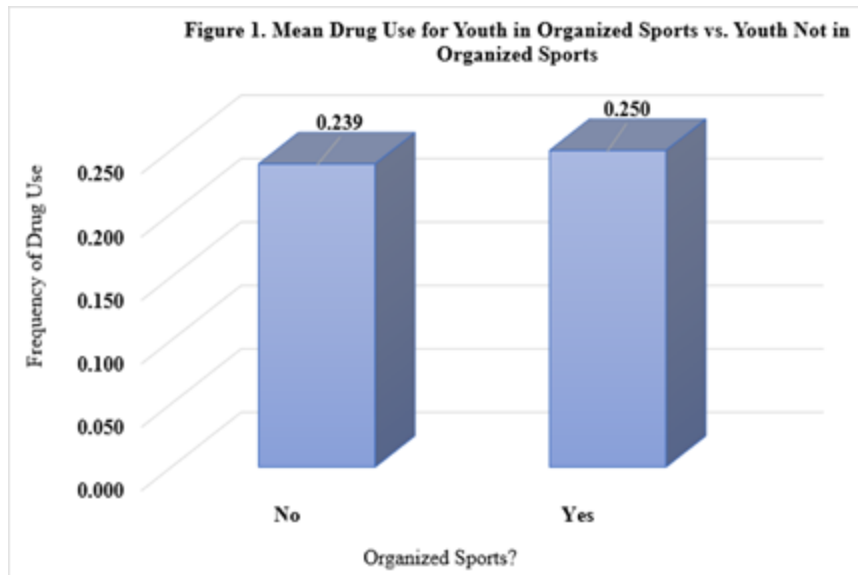


Figure 1 shows the bivariate relationship between participation in organized sports and frequency in drug use. As seen in the figure, the mean for drug use in those who participate in sports (0.250) is slightly higher than the mean drug use for those who do not participate in sports (0.239). However, this difference is associated with a p-value of 0.485, indicating that it is not statistically significant. In contrast, figure 2 shows the bivariate relationship between

participation in organized sports and mean frequency of alcohol use, and in this case, those who do not participate in organized sports have a higher frequency of alcohol use (1.611) than those who do participate in organized sports (1.524). While the difference is not large, the results are statistically significant, suggesting that participation in sports leads to a decrease in alcohol use, at least before considering potential confounding variables (i.e., factors that may be related to both sports participation and alcohol consumption). As noted earlier, there are many potential confounding variables that could be influencing these results. To ensure that the lower frequency of alcohol consumption among those involved in organized sports summarized in figure 2 is not spurious (i.e., explained by other factors), it is crucial to also run multivariable regression models that consider other variables.

The results of multivariable regression models are presented in tables 3 (drug use) and 4 (alcohol use). In both tables, results are shown from two models. The first model includes all control variables, to examine whether the estimated relationship between sports participation and substance use is altered after adjusting for other types of individual differences. The second model integrates the measure of unstructured socializing to examine whether any observed remaining influence of participation in organized sports may be explained by differences in the degree to which youth spend time together with peers in unstructured ways that could facilitate substance use.

The results of Table 3 (model 1) show that the frequency of drug use is greater among males, non-Latino white youth, those who are exposed to more digital media, and those in larger communities. Cutting classes, being suspended, and hanging out with peers who dropped out also increase drug use. Youth from two-parent families and those who expect to attend college

reported significantly less frequent drug use. After controlling for these factors, youth who participated in organized sports are no different than others in terms of drug use frequency.

Model 2 reveals that drug use is higher among those who interact with peers in unstructured ways more frequently, and that it is lower among those who consider drug use to be riskier. Nonetheless, adding these variables does not alter the conclusions about the role of organized sports for drug use, as the results continue to show no discernible difference between sports participants and non-participants in the use of marijuana, LSD, psychedelics, and inhalants. This main take-away is illuminated in figure 3, which shows that drug use among the two groups is quite similar.

Table 3. Multivariable regression of drug use frequency on participation in organized sports and the control variables.

	Model 1	Model 2
Participation in Organized Sports	-0.012 (0.014)	0.014 (0.014)
Sex (1=male)	0.029 * (0.013)	0.02 (0.012)
Race-Ethnicity		
Black	-0.142 ** (0.026)	-0.086 ** (0.02)
Hispanic	-0.033 * (0.016)	-0.010 (0.016)
Unknown	0.004 (0.016)	0.031 * (0.015)
Digital Media	0.108 ** (0.01)	0.071 ** (0.010)
Hours Gaming	-0.019 ** (0.004)	-0.014 ** (0.004)
Community Type		
MSA	0.033 * (0.0156)	0.018 (0.015)
Large MSA	0.062 ** (0.017)	0.041 ** (0.016)
Grade (10th)	0.145 ** (0.012)	0.127 ** (0.011)
Maximum Parent Education	-0.004 (0.004)	-0.002 (0.004)
Two Parent Household	-0.063 ** (0.014)	-0.065 ** (0.014)
Cutting Class	0.119 ** (0.007)	0.103 ** (0.007)
Dropout Friends	0.143 ** (0.013)	0.122 ** (0.012)
Held back	-0.069 ** (0.022)	-0.047 * (0.021)
Suspended	0.182 ** (0.016)	0.0156 ** (0.015)
College Expectations	-0.046 ** (0.012)	-0.043 ** (0.012)
Work		
Work less than 15 hrs	0.028 (0.015)	0.011 (0.015)
Work more than 15 hrs	0.103 ** (0.027)	0.081 ** (0.026)
Alone after School	0.008 (0.004)	0.001 (0.004)
Risk of Drugs		-0.129 ** (0.007)
Unstructured Social Interaction		0.118 ** (0.011)

*p < .05, **p < .01, based on two-tailed t-test

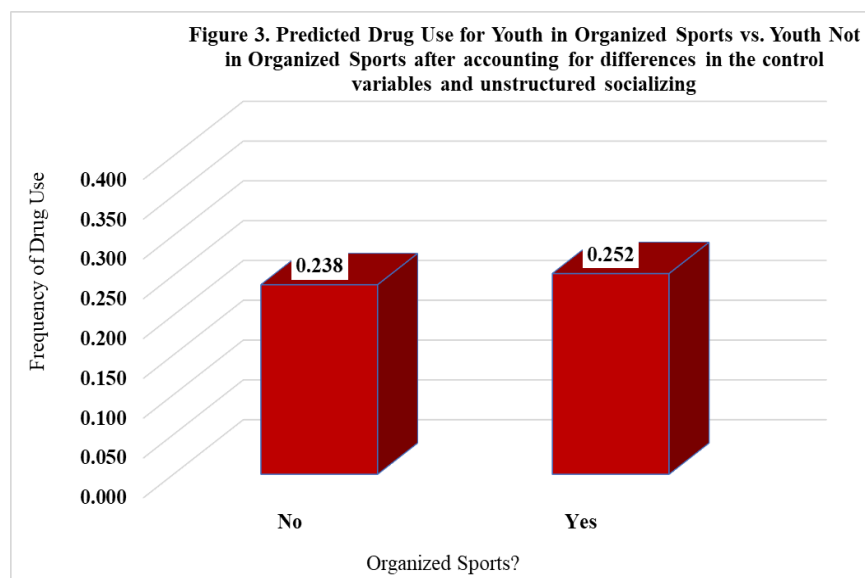
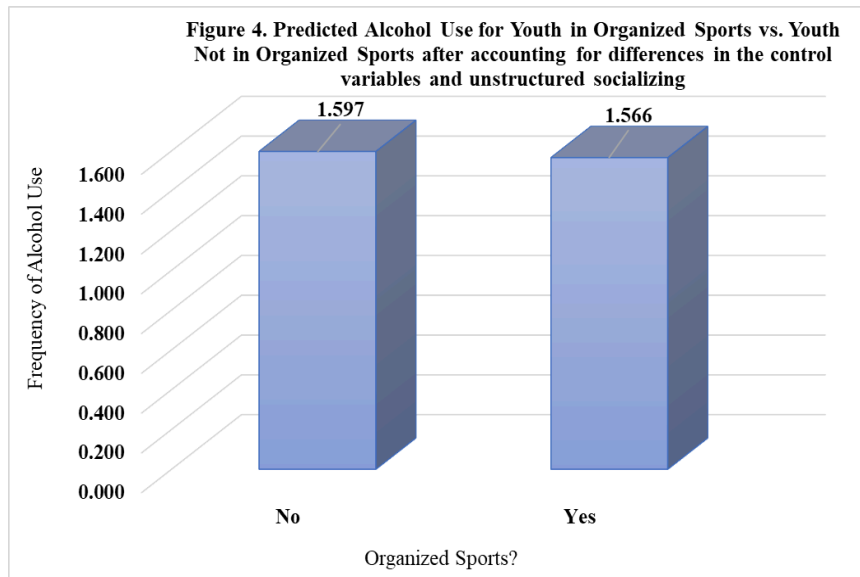


Table 4 shows a parallel set of multivariable results for alcohol consumption. Many of the control variables exhibit relationships with alcohol frequency that is consistent with the findings shown for other drug use (table 3). However, even after controlling for those variables, model 1 reveals that youth who participate in organized sports consume significantly less alcohol than non-participants. This is consistent with the idea that youth who participate in sports drink less often because they are less likely to socialize in unstructured ways with their peers outside of team-based activities. To probe that speculation more directly, model 2 integrates the measure of unstructured socializing considered. As table 4 shows, after adjusting for differences in unstructured socializing, differences in alcohol consumption among youth who do and do not participation in organized sports are reduced and are no longer statistically significant. Figure 4 summarizes that finding by showing the predicted alcohol consumption for the two groups based on the results in model 2.

Table 4. Multivariable regression of alcohol use frequency on participation in organized sports and the control variables.

	Model 1	Model 2
Participation in Organized Sports	-0.116 ** (0.029)	-0.030 (0.030)
Sex (1 = male)	0.064 * (0.027)	0.037 (0.027)
<u>Race-Ethnicity</u>		
Black	-0.363 ** (0.044)	-0.319 ** (0.043)
Hispanic	-0.116 ** (0.034)	-0.109 ** (0.034)
Unknown	-0.131 ** (0.034)	-0.108 ** (0.033)
Digital Media	0.203 ** (0.020)	0.123 ** (0.021)
Hours Gaming	-0.042 ** (0.009)	-0.031 ** (0.009)
<u>Community Type</u>		
MSA	-0.031 (0.033)	-0.039 (0.033)
Large MSA	0.073 * (0.035)	0.070 * (0.035)
Grade (10th)	0.362 ** (0.026)	0.354 ** (0.026)
Maximum Parent Education	0.005 (0.008)	0.004 (0.008)
Two Parent Household	0.030 (0.030)	0.019 * (0.029)
Cutting Class	0.215 ** (0.016)	0.199 ** (0.016)
Dropout Friends	0.197 ** (0.027)	0.168 ** (0.027)
Held back	-0.122 ** (0.046)	-0.119 ** (0.046)
Suspended	0.234 ** (0.034)	0.214 ** (0.033)
College Expectations	-0.024 (0.026)	-0.056 * (0.026)
<u>Work</u>		
Work less than 15 hrs	0.104 ** (0.033)	0.046 (0.033)
Work more than 15 hrs	0.161 ** (0.057)	0.118 * (0.056)
Alone after School	0.043 ** (0.009)	0.033 ** (0.009)
Risk of Drugs	-0.297 ** (0.015)	-0.290 ** (0.015)
Unstructured Socialization		0.311 ** (0.023)

*p < .05, **p < .01, based on two-tailed t-test



The pattern of results in table 4 implies that participation in organized sports does not directly lead to decrease in alcohol use, but instead that sports participation reduces unstructured socializing, which in turn translates into less frequent alcohol consumption. To probe that mechanism further, an additional model was estimated that regressed unstructured socializing on participation in organized sports, the results of which are summarized in figure 5.

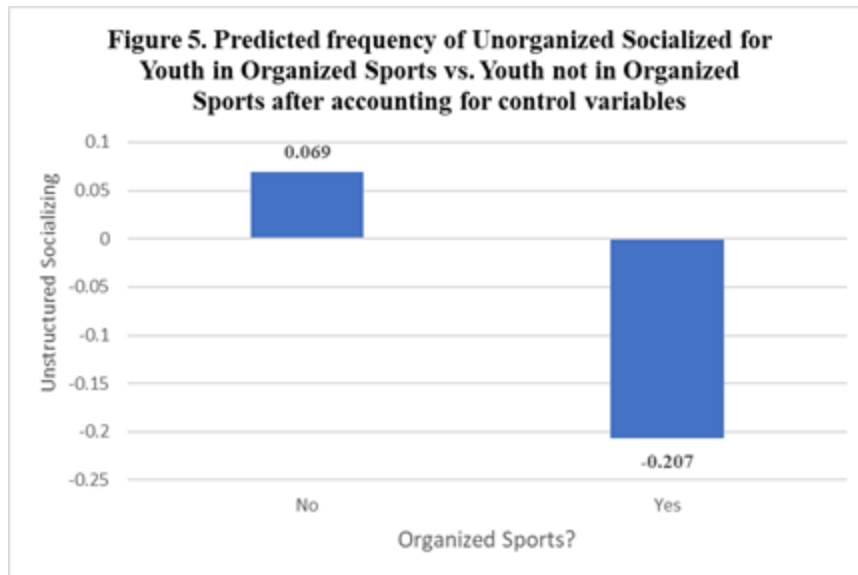


Figure 5 confirms that, next of the control variables, youth who participated in organized sports less frequently engage in unstructured socializing with peers. Combined with the results from model 2 (table 4), which documents a positive association between unstructured socializing and alcohol consumption, the core take-away for the study is that sports participation reduces unstructured socializing, which in turn translates into less frequent alcohol consumption.

V. Discussion

Prior to the statistical analysis and discoveries the hypothesis stated that if an individual in their adolescence participates in organized sports then they will be less likely to drink alcohol, and use other drugs. It was believed based on previous research and literature that this relationship would be caused by organized sports participation reducing rates of unstructured socializing in the youth. Based on the findings the hypothesis was proven partially correct and there's a lot that can be taken away from these discoveries. While the results looking at drug use came back insignificant, the examination of participation in sports on alcohol use proved to show significant and telling results. In both the bivariate and multivariate regressions regarding the dependent variable of alcohol use there was a negative correlation with participation in sports. At first it seemed that this decrease in alcohol use was directly influenced by participation in sports. But, when looking closer it becomes clear that the unstructured socializing variable was pivotal in the results. This provides a clear answer to the third research question regarding peer socializing. Sports participation's influence on the nature of peer socialization, specifically in regards to unstructured socializing, does influence the apparent relationship between sports participation and substance use.

As seen in Table 4 of the results section, model 1 shows the results for alcohol use when all confounding variables except for unstructured socializing are included, and model 2 shows the results when this variable is accounted for. Model 1 is able to do a multivariate regression that yields significant results proving that participation in organized sports leads to decreased use in alcohol. But, model two encompasses the whole story and gives us the key findings. When unstructured socializing is added to the analysis the results become insignificant. This means that

there cannot be a direct, significant relationship between alcohol use and sports participation. However, there can still be an indirect relationship. As described at the end of the results section, participation in sports leads to a decrease in unstructured socialization, and a decrease in unstructured socializing leads to a decrease in alcohol use. This indirect correlation is the major finding of the study.

While this may not be the exact anticipated results, there still is a lot of information from the literature review and hypothesis section that can explain why the negative relationship between sports participation and substance use was due to not being involved in other behaviors. Results from the drug use analysis did not show any results that support this idea, but from the main findings in alcohol use, the theory behind the hypothesis proves to be correct. The best reasoning for why the results occurred in this way can be explained by social bond theory. As discussed earlier, social bond theory believes that those who have stronger bonds to traditional society, like an organized group, will be less likely to be involved in bad behavior (Chriss, 2016). The unstructured socializing variable can be viewed as a measurement of someone's strength of bonds. A person who participates in more unstructured socializing is going to have weaker bonds and therefore participate in delinquent behavior like substance use. Conversely, the data shows us that participation in organized sports leads to stronger bonds, which gives a decrease in unstructured socializing and a decrease in alcohol use.

The research did not exactly replicate the hypothesis, but is still helpful, and can provide a starting point for this topic to be looked into even further. Previous research done on this topic pointed towards drug use being more likely than alcohol use to be negatively associated with organized sports participation. These results did not show this, as no significant findings on drug use were made. It is interesting to consider other researchers looking further into this

relationship, and possibly under the right circumstances involvement in sports can lead to a decrease in drug use. The importance of the findings in the analysis of alcohol use is significant in a number of ways. Participation in sports allows young people to be a part of something, spend valuable time with their peers, and receive oversight from an adult and potential role model. The reality is time spent doing an organized sport is time taken away from freedom to be a part of delinquent behavior. For the 8th and 10th graders who are a part of organized sports in this study, they simply do not have as much time as their peers to do things like drink alcohol. When young people lack structure they are going to be more likely to do things like go to parties and get in trouble. Being a part of a team allows young people to spend their time better and learn important lessons that can help them with the rest of their lives.

These findings can be applied to a greater audience, and can be interpreted in a number of ways. First, research can build off the finding that participation in organized sports leads to decreased unstructured socializing. By understanding these findings and concepts more young people, and parents of young people can be encouraged to get their parents involved in structured activities such as sports. While we focused on participation in sports in this study, these findings can be effective in other types of organized activities. This is where research can be expanded even more. Yes, looking at other studies of sports is valuable, but if multiple different organized activities done by adolescents are measured, the most effective one can be identified and encouraged the most. Going forward and building off this research more adolescents should understand and be pushed to be involved in positive, structured activities instead of unsupervised, unorganized activities that give them more potential to cause harm to themselves and those around them.

VI. Conclusion

The purpose of this study was to examine the effects of participation in sports on substance use. Through comparing the effects of participation in organized sports, on alcohol use and drug use, this relationship was explored and showed valuable conclusions. Based on the hypothesis the anticipated results were that participation in organized sports would lead to a decrease in substance use, due to the effects of sports participation on the peer socializing setting. The reality of the study found only a significant relationship with participation in organized sports being negatively associated with alcohol use. Under further evaluation these findings were caused greatly by unstructured socializing, which was negatively associated with organized sports participation. This study provides valuable discoveries to the field of Criminology, particularly in regards to studying delinquency and substance use. Adolescents are at a difficult time in their lives, so continuing to research how to best help them and prevent them from destructive behavior is always needed.

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