Inequalities in Sport Access and Participation among American High Schools

Thesis

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Abstract

Decades of research have demonstrated an association between athletic participation and positive outcomes (e.g., higher grade point average, college attendance, and self-esteem), yet such work has yet to adequately recognize significant resource and opportunity disparities across schools in the United States—disparities that tend to be associated with social class and racial segregation, and that could very well carry over into extracurricular, including athletic, opportunities. In this thesis, I analyze inequalities in access to high school sports and the implications for and variations in individual participation. Drawing on the Education Longitudinal Study, a nationally representative data set on high schools and their students, I first analyze the extent to which sports availability across public high schools reflects broader patterns of concentrated social class and minority disadvantage. Secondly, I examine the consequences of the inequality patterns identified for individual sports participation. Findings reveal clear inequalities, with poor and high minority concentrated schools offering significantly fewer sports to their students than do middle/upper class and white-concentrated schools. Such structural disadvantage compounds the diminished likelihood that lower income students will participate in sports schools. The higher average individual likelihood of participation among African American students is significantly offset in segregated, disadvantaged school contexts, such that they would participate in greater numbers if resources at the
school level were more equitable. I conclude by discussing these results and their implications for broader discussions of both inequality and opportunity within U.S. schooling and adolescent development in general.
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Introduction

The integration of athletics into the formal education experience of high school students is a phenomenon unique to the United States, but to what effect? Coleman (1961) examined sport as one of a handful of extra-curricular activities that, he asserted, would take time away from academic studies and undermine academic performance. Numerous studies have since debunked Coleman’s zero-sum model. Extra-curricular participation, in fact, has been shown to correlate with positive academic benefits including higher grade point averages (GPA) (Hanks & Eckland 1976; Otto 1975; Otto & Alwin 1977), lower dropout rates (Mahoney & Cairns 1997; Mahoney 2000), and higher educational aspirations (Rehberg & Schafer 1968; Spreitzer & Pugh, 1973). In addition, studies have also associated extracurricular participation with social benefits including reduced risk behavior and higher self-esteem (Marsh, 1993; Marsh and Kleitmann 2003; Schendel 1968).

As scholars began to focus on athletics as a distinctive form of extracurricular activities, they found similarly beneficial effects. Coleman’s (1961) leading crowd hypothesis suggested one possibility for this relationship: that the integrative benefits boost students’ commitment to school generally. This interpretation prodded scholars to account for possible confounding factors, such as socioeconomic status (SES), that might
explain the gains. Even after accounting for these factors, however, studies consistently found that sports participation remain positively associated with students’ social and academic outcomes, including reduced risky behavior (Fejgin 1994; Zill et al. 1995; Eccles & Barber 1999) and higher self-esteem (Marsh 1993; Erkut & Tracy 2002; Perry-Burney & Takyi 2002). Participating in high school athletics also continues to be associated with higher standardized test scores and GPA (Fejgin 1994; Marsh 1992, 1993; Broh 2003; Stevenson 2010), as well as higher educational aspirations and achievement (Marsh & Kleitmann, 2003; Dufur & Troutman 2007; Melnick et al. 1992). Such evidence suggests that integrating sports participation within the formal educational process yields positive results that can profoundly shape the lives of student athletes.

Although most evidence points to benefits from sports, prior research is largely, if not conspicuously, silent about inequalities in access, especially by race and social class. School-based segregation by race and class perpetuates social stratification through unequal allocation of educational resources and experiences. This is particularly relevant to segregated Black schools, given historical disadvantage and recent trends of increased segregation (Orfield 2001; Orfield and Lee 2007). Material resources likewise vary between poor and non-poor schools (Monk 1981; Sutton 1991), and these variations can lead to decreased access to resources including new technology (Lockheed 1986), higher credentialed teachers (Condron & Roscigno 2003), and advanced placement (AP) courses (Roscigno et al. 2006). It is thus reasonable to expect that the availability of sports and their utilization will similarly vary.

Some work briefly addresses questions of access and utilization by highlighting variation in school size (Barker and Gump 1964; Lindsay 1984) and institutional
emphasis (McNeal 1999; Guest & Schneider 2003), yet the literatures on both school level inequalities and sports in general say little about systematic differences. The impact and relevance of socioeconomic and racial composition may not only exist, but seem to be increasing in magnitude (Snellman et al 2015). Sports are uniquely integrated into academic institutions in the United States, and arguably at varying levels. Understanding the implications of inequalities in access and participation is important for the sociological understanding of youth development, inequality, as well as institutional disadvantage.

Drawing on nationally representative data on high schools and their students, I use in this thesis ordinary least squares (OLS) regression to assess if and how sport availability varies depending on the class and racial compositions of high schools. To capture how school level factors affect whether an individual participates in a sport or not, I utilize a hierarchical logit model capitalizing on the nested nature of my data. My findings suggest that access to high school sports is indeed restricted for poor and minority populations. Moreover, and even within the unequal sport landscape, students of low SES are less likely to take advantage of sports. Blacks similarly experience contextual disadvantages in access, though seem more likely to participate when the opportunity is available—a point perhaps related to mobility perceptions and prospects in the areas they disproportionately reside.
The Role of Sports in Education

James Coleman’s *The Adolescent Society* (1961) was the most prominent early sociological text to address the role of sports for high school students. Coleman theorized that students involved in activities unrelated to academics would perform worse in school than their peers without such distractions. Ironically, Coleman’s data on high school students presented in the book did not support this theory, as the athletes in his study displayed higher GPAs than their non-athlete peers. Coleman’s sample of high school athletes, which included only those considered the “best” athletes, fueled confusion for the applicability of his zero sum model. As an alternative, Coleman suggested that the social status assigned to successful athletes would draw the most talented individuals to heralded sports teams. He believed that the correlation between talented students and those who chose to participate in sports explained why athletes received higher grades. Rehberg (1969) gives credence to this “leading crowd” hypothesis, which remains relevant in the literature on high school sports for decades.

Subsequent studies continued to churn out results that were incongruous to the zero sum model. Coleman’s zero sum model did not only apply to athletic participation, but other extracurricular activities as well. Much of the literature following this initial inquiry into sports addressed the broad spectrum of extracurricular activities. Examining
a wider variety of activities, including student government and service organizations, Spady (1970) found that extracurricular activities in general were associated with higher grade point averages (GPA) and college aspirations. Otto’s (1975) findings confirmed Spady’s proposed connection between extracurricular participation and educational attainment and college enrollment. Each of these studies proposes a peer group effect through socialization that is consistent with the leading crowd hypothesis. Talented individuals, and those who have higher educational aspirations, are likely to participate in extracurricular activities, and thus exert a positive influence on other participants who may or may not be talented enough to be part of the leading crowd.

Regardless of the causal mechanism, the association is apparent, and scholars have produced analyses that not only corroborated these findings (Hanks & Eckland 1976; Spreitzer & Pugh 1973) but also add to the catalogue of positive outcomes associated with extracurricular participation. Studies show that extracurricular participation is associated with higher self-esteem (Grabe, 1981; Phillips, 1969; Schendel, 1968) and lower dropout rates (Mahoney & Cairns 1997; Mahoney & Stattin 2000; Mahoney, 2000). Mahoney’s research is particularly noteworthy in that his results regarding socially disadvantaged students suggest the leading crowd selection mechanism is not the only factor explaining the associated benefits with extracurricular participation. Thus, contrary to Coleman’s assumption that such activities might be a distraction from academics, we now know that they tend to confer meaningful social and academic benefits.

In an attempt to parse out the effects of distinct activities, more recently Broh (2002) examines the effects of extracurricular involvement. Playing a sport in high school
is associated with higher grades in Math and English, as well as a higher score in reading. School music participation, it appears, is the only other activity with distinct benefits in three outcome categories, and athletes had a greater magnitude in all three categories than music students. Eccles and Barber (1999) also differentiate sports from other extracurricular activities, noting that athletic participation is associated with lower high school dropout rates as well as higher levels of enrollment in college as compared to those participating in other types of activities. Marsh and Klietmann (2003) also find that sport participation, specifically extramural sports and team sports, is associated with numerous desirable academic outcomes when compared to other extracurricular activities, including higher grades, better chances of attending college, and higher ultimate level of educational attainment. These studies help separate high school sports from other extracurricular activities, indicating that there is something unique about athletic participation that improves, among other things, the grades, college enrollment and high school dropout rates of athletes.

More recent research suggests that the effects of athletic participation are positive for both social and academic outcomes. Students participating in high school athletics are more likely to have higher self-esteem than their non-athlete counterparts (Marsh 1993; Erkut & Tracy 2002; Perry-Burney & Takyi 2002). Athletic participation is associated with lower levels of risk behavior (Fejgin 1994; Zill et al. 1995; Eccles & Barber 1999; Rendon 2008). Student athletes display better health habits (Steiner et al 2000; Gore et al 2001). Participating in high school athletics is associated with higher standardized test scores and GPA (Fejgin 1994; Marsh 1992, 1993; Holland & Andre 1987; Whitley 1999; Howell et al 1984). These students are also more likely to aspire to, as well as attend
college (Dufur & Troutman 2007; Melnick et al. 1992; Howell et al 1984; Snyder & Spritzer 1990). Finally, athletic participation is associated with lower dropout rates (McNeal 1995; Mahoney & Cairns, 1997).

Broh (2002) and Marsh & Klietmann’s (2003) studies highlight the varied theoretical explanations for athletic participation benefits. Broh orients her controls in such a way that she tests the salience of the leading crowd hypotheses, as well as what she calls the “developmental model” and the “social capital model.” The former is associated with the assumption among many proponents of youth sports, which suggests that playing a sport develops necessary habits and traits, such as hard work and perseverance, for success in other realms. The latter posits that participating in a sport leads to greater social capital through more expansive networks of peer and adults, whether coaches or parents. Broh’s analysis suggests the salience of both the developmental model and the social capital model, but it rejects the leading crowd hypothesis. Marsh and Klietmann take the time to reject the zero sum model, and they present an “Identification/Commitment Model” which posits that athletic participation increases attachment to a school, therefore making it more likely that a student will orient themselves to the goals and values of the institution. There is no consensus in the literature, at least to date, as to which argument has the greatest support. In fact, in a review of the literature that addresses the role of extracurricular activities on the development of young people, Feldman and Matjasko (2005) specifically call for better theoretical model that can explain these positive effects.

Recent literature reveals consistent positive effects for students who play high school sports. However, this literature has not addressed who has access to high school
sports in the first place, and whether or not there are systemic biases in participation. In order to better understand the implications of research on high school sport participation, it is necessary to understand the structural forces shaping who participates.

**Structural Disadvantages in Education**

Scholarly research on education has a long tradition of documenting the inequalities in school performance, detailing how funding and resource discrepancies perpetuate stratification within American society. Developing a public education system based on property taxes led to major discrepancies across the country. Following the Civil Rights act of 1964, James Coleman and colleagues produced a report (1966) intended to address and document the inequalities in education faced by minority and poor populations. In the two decades following *Serrano v. Priest* (1971) in California, over 40 states restructured funding policies to alleviate discrepancies in education quality (Berkman & Plutzer 2005). However, racial and class segregation persists in public schools. The following discussion illustrates some of the trends of school resource disadvantage.

The school funding structure of the United States, which is based on property taxes, has created tremendous variation in education quality. Resources are scarcer in districts serving poor and minority communities (Bowles and Levin 1968; Coleman et al. 1966; Ginsburg et al. 1980; Monk 1981; Wise and Gendler 1989). Schools serving poor and minority students have less funding which inhibits their ability to teach and adapt to advances in education. Over time, technological advancements have allowed for enhanced learning opportunities in schools. As schools began to utilize computers in the 1980s to improve education, poor and minority students had less access to these
increasingly vital resources (Lockheed 1986; Sutton 1991). While wealthy districts are able to pass tax referenda to build new additions to their schools or provide a desired influx of material resources, poor schools struggle to maintain adequate facilities. These schools must worry about eroding sewage pipes, collapsing ceilings, and lack of heat (Kozol, 1991). Not only do poor schools have a daunting resource gap to overcome, but that gap is widening given the lack of infrastructure.

Schools serving Black and poor populations struggle to develop students for the competitive post-secondary education market. Advanced Placement (AP) classes are restricted by the composition of schools. Since the 1980s, AP classes have become an increasingly important resource to strengthen students’ college applications (Geiser & Santelicies 2004; Klugman, 2012). This trend is troubling, as the availability of these courses is disproportionately limited for poor and Black students (Gamoran 1992; Geiser & Santelicies 2004; Oakes 1990; Roscigno et al. 2006). Teacher turnover is another obstacle that disproportionately affects disadvantaged students, and is a pressing issue for schools serving low income students (Allensworth et al. 2009; Hemphill & Nauer 2009; Ingersoll 2001; Johnson et al. 2005; Marinell & Coca, 2013). Unsurprisingly, trends in teacher turnover lead to more qualified teachers departing disadvantaged schools, leaving poor students with the least experienced teachers (Ingersoll 2001; Sander & Rivers 1996; Clotfelter et al. 2007). This phenomenon is particularly troubling as poor students are more affected by the quality of their teachers, and teacher continuity is imperative for these students to receive the education they deserve (Downey et al 2008; Ronfeldt et al. 2013). In addition to having less funding and fewer institutional resources, these
disadvantaged students are less likely to have high quality teachers and courses compared to their more advantaged peers.

It is important to recognize that while some improvements have been made in addressing funding inequalities between school districts, analysis of within school district spending reveals the tendency to funnel money and resources to already advantaged schools. Condron and Roscigno (2003) examine inequalities within school district spending, finding that schools with the lowest proportion of poor students spend $790 more per pupil than schools with the highest proportion of poor students. These funding discrepancies manifest in lower building and teacher quality for schools with higher concentrations of poor students. Other studies corroborate Condron and Roscigno’s findings that intradistrict spending is unevenly distributed, as poorer schools within districts do not pay teachers the same salaries and infrastructure spending disadvantages these schools (Burke 1999; Iatarola & Stiefel 2003; Roza & Evans, 2005; Roza et al. 2005; Rubenstein 1998).

There are powerful and durable structural disadvantages in the public school system, which manifest in a variety of ways that lead to a lower quality education for poor and minority students. Schools of this type must struggle to overcome lasting impacts of funding inequality; they are left behind as schools introduce new factors such as technology and AP courses to improve their education. The reality is that teachers and administrations are burdened with unrealistic demands without the money or organizational stability to provide a quality education for their students. While sports are thoroughly integrated into the education system, no studies to my knowledge have addressed how sport availability varies across high schools. It follows that sports, and the
benefits associated with athletic participation, vary in their access depending on the type of school a student attends. A wealthy school district has the luxury of adding a tax referendum to the local ballot that would fund a new athletic facility, while disadvantaged schools are forced to divert monetary resources towards immediate necessities such as plumbing or heating maintenance, rather than constructing an all-purpose track on their grounds.

Variation in Athletic Participation

Access to sports is only one aspect shaping the chances that an individual decides to participate in high school athletics. If every student had the same access to sports in high school, would disadvantaged students participate at higher rates than they do now? Racial differences in school sport participation has been an area of speculation, with little consensus on the extent of participatory inequality. There are studies suggesting that whites are more likely to play sports than Blacks (Gerber 1996; Ingels et al. 2005), others suggesting that Blacks are more likely to play sports than whites (Mahoney and Cairns 1997; McNeal 1998), and still others finding no racial difference in athletic participation (Brown and Evans 2002; Fejgin 2001).

Common narratives perpetuate the notion that athletics are one of the few sources of social mobility for racial minorities. Indeed, while scholars have speculated about racial differences (Carrington 1986; Edwards 1976) there is a lack of empirical studies that have successfully decomposed student populations to see if Blacks are disproportionately represented overall. Research about racial differences in sport participation has disproportionately focused on explaining the overrepresentation of Black students in athletics, but there is limited empirical evidence to support these claims.
Blacks in certain sports, particularly football and basketball (Hoose 1989; George 1994; Goldsmith 2003), with little consideration for the broader access of sports among schools.

Research on class differences in athletic participation suggests that upper-class students are more likely to participate in high school athletics than their lower class peers. Annette Lareau’s (2002) work on parenting strategies suggests lower class students would be less likely to participate in high school sports than their middle and upper class peers. Parents of middle class children practice concerted cultivation, which entails highly organized schedules full of extracurricular activities. Parents practicing this child rearing strategy utilize their social networks to find out about preferred activities for development, and they leverage their economic resources to enroll their children in activities that they believe will help the growth of their children. Lower class parents who do not have the social networks or economic resources for concerted cultivation instead allow their children to occupy their free time as they please, with little directive towards organized activities such as school sports. Indeed, research provides evidence that students of higher socioeconomic status are more likely to participate in high school sports (Goldsmith 2003; McNeal 1999).

Recent research suggests that differences in athletic participation are increasing, with enduring consequences for the life chances of less advantaged individuals. Snellman and colleagues (2015) link discrepancies in extracurricular participation with declining social mobility. They demonstrate that over the last 40 years, students from the highest quartile of socioeconomic status are increasingly more likely to participate in extracurricular activities, while the lowest quartile of students has not experienced increased participation. In the face of heightened competition for college admission,
middle and upper class families leverage their resources to improve their children’s “resumes” which includes extracurricular activities and participating in sports. Given that high school athletics are associated with positive outcomes related to secondary education, such as higher GPA and higher likelihood of college attendance, it follows that more advantaged students are more likely to utilize high school sports as one avenue to successful enrollment in college. Having access to high school athletics can have real consequences for income inequality in the US if higher SES families disproportionately occupy roles that strengthen college resumes. Understanding variation in sport access could be helpful to policy makers and educators who hope to address post-secondary stratification based on race and class status. In this paper I explore differential athletic participation in high school by examining the institutional access of sports as well as possible class and race based discrepancies in utilization.

*Expectations Regarding Inequality, Sports Availability, and Participation*

Given the literature documenting numerous benefits for students participating in high school athletics, my analyses focus on both access and participation: are there inequalities in access to high school sports based on school composition? And if so, what implications do these structural inequalities have for individual athletic participation? Research on school disadvantage has documented how poor and Black schools have limited resources to the detriment of their educational experience. Yet these studies have not addressed the availability of sports generally. Additionally, research has shown that children from middle and upper class backgrounds are more likely to participate in extracurricular activities (Lareau 2002), with important implications for college
admissions and social mobility (Snellman et al. 2015). However, we do not know to what extent variation in availability explains participatory differences. Finally, the literature has not reached a consensus on the overall frequency of Black student participation in high school sports. There has been speculation about the overrepresentation of Blacks in certain sports, but none of these studies, to my knowledge, capture high school athletic participation. Severe resource deprivation disproportionately affects Black students across the country, given the history of racial segregation in neighborhoods and schools through mechanisms such as Jim Crow laws, red lining real estate policies, and white flight (Massey & Denton 1998). Using a nationally representative data set on high schools across the United States, I address these gaps in the literature in order to further understand how athletics help shape inequality. I test the following hypotheses:

Hypothesis 1: Schools with majority poor or Black students will have fewer sports available than white and middle class schools.

Hypothesis 2(a): Accounting for school level access to sport will mitigate the difference in participation for students across different levels of SES, but the discrepancy between low and high SES students will still be significant.

Hypothesis 2(b): Accounting for school level access for sport, Blacks will be even more likely to participated in sports than non-Blacks
Data and Methods

To answer my research questions, I will use the Education Longitudinal Survey (ELS), a nationally representative data set that first sampled 752 out of an initially identified 1,221 US high schools. From the school sample, the ELS then selected a student sample, collecting information on approximately twenty six sophomores for a total sample of more than fifteen thousand (N=15,362) students. The first wave of data was collected in 2002. The students sampled were in 10th grade during the first wave of data collection. The ELS also collected follow up data in 2004 when most of the students had progressed to 12th grade, and contains a third wave of data in 2006.

There are two parts to the ELS: one has information collected from individual students, and one has information from a school administrator or principal. Critically for this research, the school level survey collects information on every sport that is available in a given high school. The question asks school administrators to indicate which of a list of 16 extracurricular sports are available, with an option to indicate additional sports not listed. At the individual level, the ELS prompts students to provide information about their participation in school sponsored extracurricular activities. The representative nature of the data set, coupled with its questions about high school sports, makes the ELS a valuable resource to address questions of high school sports availability and utilization.
The ELS also contains relevant data related to the predictors of interest and controls for my study. The following section details the variables I use for this study.

Variables:

In order to assess the access and utilization of high school sports across the country, I create two separate dependent variables for the analysis. As mentioned earlier, the school survey asks administrators to indicate what sports are available at their school. The administrators are provided a list of 16 sports that include more ubiquitous sports such as football and basketball, as well as rarer options such as gymnastics and golf. The administrators are asked to indicate which sports are available to boys and which are available to girls. I create a variable totaling the count of sports associated with each unique school ID. Of the 752 schools in the study, 87 received an abbreviated version that did not include the list of sports available. While imputing values for the dependent variable has become more accepted in recent literature (Young & Johnson 2013), I case-wise delete the schools who received the abbreviated survey. The results should not be biased since the abbreviated survey was distributed randomly, and thus we can assume these cases are missing completely at random. Additionally, there are cases of missing data due to non-response for gender availability at schools that are not coeducational. 19 schools in the study are all-female and 22 are all-male, thus accounting for some of the missing data involved with my dependent variable. However, by counting the number of sports available, the missing data for single gender schools is no longer an issue, as each school ID still has an accurate count of their sports available.
The second dependent variable in my analyses captures individual level participation in sports. The responses are coded as “no interscholastic sport team,” “did not participate,” “participated at junior varsity level,” “participated at varsity level,” and “participated as varsity captain.” While there are qualitative differences in the level of participation associated with playing a junior varsity sport and being the captain of a varsity team, I conceptualize participation as simply playing an available sport. Capturing the qualitative differences in sport participation would be useful in a study attempting to assess the causality between sport participation and its associated benefits, but such analysis would overlook the broader availability of sports across the country. Take for example the difference between a junior varsity participant and a varsity captain. Measuring these levels of participation differently would not capture inequalities in access in schools that may not offer junior varsity sports. Therefore, I create a dummy variable to assess participation, grouping “no interscholastic sport team” and “did not participate” as “no,” and the remaining three participatory responses as “yes.”

As discussed in the review of the literature, schools serving high minority and poor populations are frequently resource deprived. Accordingly, the main two predictors of interest for my analysis are the class and race composition of the schools. An advantage of rich, multilevel data such as the ELS is that we can aggregate or disaggregate from one level to another. The responses from students for the individual survey are nested within the school level administrator survey, with a unique ID for each school that is attributed to each student within a school who took the individual survey. Therefore, while there is no information at the school level on racial composition, I create a racial composition variable by aggregating student race to the school level by
collapsing the mean of each school ID’s race variable. School resource inequality has historically focused on black-white inequalities, rooted in the history of the Coleman Report (1966) which assessed school inequality in light of the Civil Rights Act. The ELS includes ethnicities that do not neatly fit into the relevant school inequality literature, including Asian Americans and Native Americans, and individuals who identify as multiracial. I recode individual race as Black and non-black for my main analysis. The racial composition variable in the OLS regression is categorical, rather than continuous, grouping together compositional values to create segregated white, integrated, and segregated Black schools. This is consistent with previous studies examining Black/white school inequalities (Entwisle & Alexander 1994; Roscigno 1998).

Schools with small numbers of student responses can bias the analysis with inaccurate representation of their student population. However, this is only a minor concern in my racial composition variables, as the ELS aimed to survey 26 students in each school. The ELS weights schools according to the number of individual student responses which could exacerbate the bias caused by inaccurate racial compositions; fortunately, less than five percent of schools have fewer than 10 student responses.

My second predictor of interest is the class composition of the school. Unlike racial composition, the ELS provides a school level response for social class by asking the administrator to indicate the percentage of students who receive free lunch. The administrator questionnaire identifies the percentage of students who receive free lunch; however, this measure of social class composition is likely to yield conservative results in my analysis, since many disadvantaged students may not qualify for free lunch. Therefore, I aggregate the SES score assigned to individual students by school ID in
order to generate another measure of class composition. The ELS provides two composite measures of individual SES based on father’s education, mother’s education, family income, father’s occupation, and mother’s occupation. I used the second SES measure, which is consistent with the 1989 GSS occupational prestige score, rather than the first which is consistent with the 1961 Duncan index for measuring occupational prestige. Remaining consistent with my measure for racial composition, I group the mean SES scores for each school into three categories: low SES, medium SES, and high SES.

The ELS also contains relevant control variables including school size and region, and whether the school is public or private. Region and school type are four and three category responses, respectively. The sampling strategy of the data set yields complete data on the 10th grade class size for every school. This variable groups the responses categorically, with seven different ranges for class size. I find this to be a preferable control for school size given the number of incomplete responses by school administrators on the overall school size. Additionally, this question does not specify the range of grades in a high school, which could lead to biased data in the case of schools with 7th and 8th grade programs subsumed within the high school.
Analytic Strategy and Results

To answer my first research question, regarding whether sport availability varies by school, I use ordinary least squares (OLS) regression to see whether the number of sports available within schools differs based on the class and racial composition schools. To answer my second research question of how varying availability affects individual participation, I utilize a multi-level model. This method is appropriate to account for structural contexts when looking at individual behavior. Variance in sport availability will shape the individual choices for student participation, and a multi-level model will allow for me to account for structural inequalities. A study design using single level statistical analysis is not able to assess the structural impact of individual behavior. A hierarchical logit model is ideal to assess a dichotomous outcome at level one in the case of nested data.

Since my dependent variable is a measure of whether or not an individual student participated in a sport, I employ a hierarchical logit model. I reverse code SES at both the individual and school level in the multilevel model, so that an increase in value reflects an increase in disadvantage. The individual SES scale ranges from -2.11 to 1.98, while school composition ranges from 1 to 3.96. School SES composition is continuous in the multilevel model rather than categorical to improve the precision of the model.
First, I will examine the unconditional model with the outcome variable as individual sport participation, characterized by the following notation:

Level 1:

Prob(Y=1| \beta) = P

\log[P/(1-P)] = \beta_{0j}

Level 2: \beta_{0j} = \gamma_{00} + u_{0j}

\beta_{0j} represents the log odds of participating in a sport. My first model introduces SES and Black composition, as well as class size and rurality as controls. Rurality is a dichotomous variable where 0 indicates the school is in an urban or suburban context, while 1 is a school in a rural area. All variables in this model are grand mean centered, indicated by italics.

Level 1:

Prob(Y=1|\beta) = P

\ln[P/(1-P)] = \beta_{0j}

Level 2: \beta_{0j} = \gamma_{00} + \gamma_{10}*(Size) + \gamma_{02}*(Blackcomp) + \gamma_{03}*(SEScomp) + \gamma_{04}*(Rurality) + u_{0j}

The next model introduces sports availability at the school level. The model culminates by adding race and class status at the individual level, characterized by the following notation:

Level 1: Prob(Y=1|\beta) = P

\ln[P/(1-P)] = \beta_{0j} + \beta_{1)*(SES2) + \beta_{2}*(Black)

Level 2: \beta_{0j} = \gamma_{00} + \gamma_{10}*(Size) + \gamma_{02}*(Blackcomp) + \gamma_{03}*(SEScomp) + \gamma_{04}*(Rurality)

\gamma_{05}*(Sports) + u_{0j}

\beta_{1} = \gamma_{10}
\[ \beta_2 = \gamma_{20} \]

One advantage to utilizing a multi-level model is the ability to test interactions at different levels of the data. However, these interactions were not significant, so I do not represent the notation or report them in my findings.

Sports availability is a continuous variable with responses ranging from zero to thirty three. The mean value of this variable is 18.54, while the median is 20 and the mode is 21. For SES composition, the middle category contains about 50 percent of the responses with 326, while categories for low and high SES contain about a quarter of the total sample in the regression model, 188 and 168 respectively. The distribution of racial composition is more skewed, as white and integrated schools make up almost the entire sample, 336 and 289 respectively, with twenty two segregated black schools completing the responses. Table 1 presents descriptions, means, and standard deviations of all variables.

Sports Availability and Inequality

Table 2 displays the results of the OLS regression assessing access to high school sports based on the racial and class composition of schools. The model as a whole significantly predicts sports availability \((p<.001)\). Reference categories for categorical variables are listed in parentheses.

Relative to racial composition, the difference in number of sports available for segregated white schools and integrated schools is negligible. While white schools have on average .26 more sports available than integrated schools, this value is not statistically significant. However, comparing integrated schools to segregated Black schools reveals a
much starker inequality, as Black schools have 3.75 fewer sports available (p<.001), controlling for all other covariates in the model (see figure 1). Changing the reference category to segregated white schools yields similar results. These results similarly suggest that school composition has a significant effect on the number of sports offered. Low SES schools have 2.24 fewer sports available than medium SES schools (p<.001), while high SES schools have 2.15 more sports available on average than medium SES schools (p<.001). The average sports available by racial and SES composition of the schools are displayed in graphical form below (see figure 2). These results provide evidence that there are systematic inequalities in access to sports in high schools.

The remaining variables in the model are included as controls in access to sports, but they are useful to identifying patterns of sport access. Scholars have long understood the significance in school size in predicting variation in school resources and experiences (Barker & Gump 1964), and the results of the model confirm these patterns. Schools with the smallest sophomore class sizes, ranging from one to ninety-nine students, have on average five fewer sports available than the second smallest category of class size, controlling for all other covariates in the model. Each successive category of class size offers significantly more sports than the reference category, and the magnitude of the coefficient increases in accordance with size. It is interesting to note is that the difference in sports offered between schools with class sizes of 1-99 and 100-199 is larger in magnitude than the difference between 100-199 and the largest category of class size, 700 or greater. These results suggest there is not a linear increase in sport availability as a high school increases in size, which could have implications on the chances an individual student participates in sports.
Sport availability also varies by school control. Public schools consist of 77 percent of the schools in the ELS, while Catholic schools are distinct from other private schools in the sample. Both types of private schools have at least 2.5 fewer sports available than public schools (p<.001), with no significant difference between the two categories. Sport availability does not seem to vary significantly across regions. Finally, rural schools on average have about one fewer sport available than suburban schools (p<.001), while urban schools do not significantly differ from these categories. The results of the OLS regression are certainly illustrative. Sport availability seems to vary depending on the racial and SES compositions of the students they serve with poor and Black schools receiving the brunt of the inequality. I now turn to the results of the hierarchical logit model to determine how school characteristics shape patterns of individual participation.

**Sport Access, Inequality, and Individual Participation**

Table 3 details the results of the hierarchical logit model, predicting the odds of individual athletic participation. Sports participation is coded simply as “yes” for participated in a sport, and “no” for did not participate in a sport. After accounting for missing data at the school level, the number of student responses in the model is 11,837. 54 percent of students indicated that they participated in a sport. Raudenbush and Bryk (2002) argue that intraclass correlation (ICC) estimates for hierarchical logit models are unreliable due to heteroskedasticity of level one variance; thus, decomposing the variance at each level for this model in not informative. However, Snijders and Bosker (1999) suggest that the distribution of level one random effects will have variance equal to $\pi^2/3$
allowing for an estimate of the ICC. This estimate for the unconditional model is .103. The value of the intercept in the unconditional model is .185, which when expressed as a predicted probability suggests an average student in these data has a 54.6 percent chance of participating in a sport. The 95 percent plausible values for the unconditional model range, in terms of predicted probability, from 26.5 percent to 80.0 percent. This suggests there is significant variation in the chances an individual participates in sports depending on their school context.

Model 1 shows that the average individual, accounting for structural variables in the model, has a predicted probability of 54.6 percent of participating in a sport. Race and class composition have negative and significant effects. Attending a school with more Black students and socioeconomically disadvantaged students negatively impacts the likelihood that the average individual will participate in sports. Black composition represents the percent of Black students in a school, thus ranging from zero to one. Attending a high Black population school results in a 32.9 percent decrease in the likelihood of individual participation, controlling for all other covariates in the model (p<.01). For each one unit increase in school socioeconomic disadvantage, an individual is 34.9 percent less likely to participate in a sport (p<.001). Additionally, in line with the results of the OLS regression, class size has a negative and significant impact on athletic participation. A one category increase in class size is associated with a 14.6 percent decrease in likelihood that an individual will participate in a sport (p<.001). Finally, the rural status of a school does not have a significant impact on individual participation, but it remains in the model due to its significance in the OLS regression.
Model 2 introduces sports availability, shown previously to be related to class and racial composition. This model suggests that structural availability of sports has a mediating effect on race and class composition in determining the likelihood of individual participation. For each additional sport available in a high school, an individual has a 2.6 percent greater chance in participating in athletics, controlling for the other variables in the model. As one might expect, the negative coefficients for Black and class compositions both decrease when sport availability is included in the model. Controlling for all other covariates, a one unit increase in socioeconomic disadvantage is associated with a 31.8 percent decrease in the likelihood an individual participates in a sport, while a student in an all-Black school is 28.8 percent less likely to participate in a sport compared to a student in a non-Black school. Finally, the impact of class size on an individual’s chances to participate in a sport increases when sport availability is included in the model. A one category increase in class size is associated with an 18.7 percent decrease in likelihood that an individual will participate in a sport.

While my analysis has thus far focused on how structural factors impact individual athletic participation, there are certainly individual factors that may explain variation in participation. Model 3 introduces individual Black and socioeconomic status. As predicted by Annette Lareau’s (2002) concept of concerted cultivation, lower SES students are less likely to participate in sports than their middle and upper class peers. Individual SES is reverse coded so that as the values increase, individuals are more disadvantaged. An individual one unit higher on the socioeconomic scale is 36.3 percent more likely to participate in a sport controlling for all other variables in the model.
Much more striking in this model is the difference in athletic participation between Black and non-Black individuals. Blacks are 47.4 percent more likely to participate in sports than non-Blacks, accounting for the other covariates in the model, and even in the face of structural disadvantages pertaining to the contexts of the schools they attend.

Introducing individual factors provides further insight to how structural factors impact the likelihood of an individual participating in sports. SES composition was highly significant in the first two models, but once individual SES and race are included in the model, the class composition appears to no longer influence the likelihood of its students participating sports. This suggests that lower class students are less likely to participate in sports than their advantaged peers, regardless of the composition of the school. However, the coefficient for Black composition increases and becomes more significant once the model accounts for individual race and class. A student attending an all-Black school is 52.4 percent less likely to participate in sports than a student in a school with no Blacks, controlling for all other variables in the model. These results suggest that Blacks are more likely to play sports than non-Blacks, and this discrepancy actually masks some of the participatory differences based on school context.
Discussion

Returning to the research questions guiding this paper, are there inequalities in access to high school sports? If so, what implications do these structural disparities have for individual participation? The literature suggests that poor and Black schools have greater resource disadvantage than high SES and white schools. Blacks are uniquely affected by these resources inequalities, as the history of economic disadvantage and special segregation in the United States compounds and interacts with school inequality.

The results of my OLS regression corroborate the patterns in the literature; just as poor and Black schools are less likely to have resources linked to educational attainment and social mobility such as AP courses (Roscigno et al 2006), they are also less likely to have sports available. These results support hypothesis 1. Predominately Black schools have more than two fewer sports available than both integrated and predominately white schools. Separating SES composition into three categories reveals similar disadvantage for those who do not attend the highest SES schools. Low SES schools have two fewer sports than medium SES schools, which in turn have two fewer sports than high SES schools. These are meaningful differences that shape the opportunities of individual students, who without equal resources are forced to face an uphill battle when competing for educational attainment.
Individual participation rates are shaped by school level factors, suggesting that there is not a level playing field for athletic participation in high school across the country. The results of the multilevel model suggest that sports availability significantly impacts the chances of an individual participating in sports, thus providing evidence in support of hypothesis 2a.

Structural factors also shape individual participation beyond the raw numbers of sports available. Black school composition negatively affects an individual’s likelihood of participating in sports. Controlling for socioeconomic and racial composition suggests that Black students would be more likely to participate in sports if they attended a different school. These results suggest that Black students attending resource deprived schools would be more likely to participate in sports if they had the opportunity, which is in line with hypothesis 2b. The results of the OLS regression reveal that sport availability is greatly shaped by the class composition of a high school. Indeed, the second iteration of my multilevel model suggests that after accounting for the number of sports available, students attending poor schools are still less likely to participate in high school athletics.

The conclusions based on these results must recognize limitations in the study design. Most notably, there are few segregated Black schools in the sample. Operationalizing school composition as continuous can account for possibly biased results rooted in the three category nature of the racial composition variable. Indeed, OLS regression using a continuous measure of composition also yields significant results indicated a negative relationship between Black composition and number of sports available. The hierarchical logit model unfortunately does not yield an interpretable intraclass correlation. While the estimate based on Snijders and Bosker’s (1999) formula
suggests an ICC of .103, it would be ideal to have a stronger understanding how much variance occurs at the school level as opposed to the individual level. Finally, measures of composition based on school level responses would improve the power of the model. Racial composition was not indicated at all in the schools survey, while the available class measure of percent free lunch was incomplete and is a crude measure of social class. Constructing compositional measures based on aggregated data from the individual level is useful, but these data could be improved.

Despite the limitations of this study, these results reveal compounding effects for lower class students and offsetting effects for Black students when it comes to individual participation and school context. Black and poor schools are indeed resourced deprived when it comes to sports availability, and net of total sports in a given high school, poor and Black school composition negatively affects the likelihood that an individual participates in sports. The results of individual class and race factors in the multilevel model show that Blacks are much more likely to play sports than non-Blacks. Individual proclivity and school context are offsetting in this situation. If Blacks were able to attend non-resource deprived schools at the same rate as other races, they would participate at even greater rates and have a higher chance at reaping the benefits associated with participating in high school athletics. Alternatively, the negative relationship between participation low SES students and low SES schools is compounding. Net of resource availability, low SES students are less likely to participate in sports than their advantaged peers and have fewer sports available. The effect of low SES composition is partially mediated through availability, but the impact of low SES also likely occurs owing to how poorer students generally invest their time.
Snellman et al (2015) argue that athletic participation in high school is likely a driving factor in social class discrepancies of high school achievement and college attendance. Students from higher socioeconomic backgrounds participate in sports and other extracurricular activities at higher rates than disadvantaged students, and Snellman and colleagues note that this discrepancy has grown over the last three decades. The results of the multi-level model indicate that attending schools with more sports available begin to address the participation gap between low and high SES students. Concerted cultivation (Lareau 2002) remains a significant explanation for class based athletic participation difference, but structural context still shapes the likelihood that an individual student will participate in high school sports.

School context greatly impacts participation for Black students. Highly segregated Black schools must cope with resource deprivation, hindering the life chances of their student populations. Fewer numbers of sports are available for students attending segregated Black schools, and the results of the multilevel models suggest that presented with a different context, Blacks will take advantage of beneficial extracurricular resources. Scholars have identified the parenting strategy that accounts for class based variation in extracurricular participation, while segregated Black schools continue to be an afterthought for much of the United States. Future research should address this compounding class effect and see how increased availability of sports in low SES schools can overcome individual class based participatory tendencies, as well as how the offsetting effects of Black participation within school context obscures the tremendous resource gap faced by majority Black schools. Despite the focus on individual variation
and habits, school resources still play a large role in shaping the activities and pursuits of high school students across the United States.
Bibliography


### Appendix A: Tables

#### Table 1: Descriptive Statistics

<table>
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<th>Variable Name</th>
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<th>Mean</th>
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<td></td>
<td></td>
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</tr>
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<td>5.96</td>
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Table 2: Aggregate OLS Regression of Sports Availability by Structural Attributes of the School

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*p<.05  **p<.01  ***p<.001

N 647
R-Squared .536
Table 3: *HLM Model Predicting Likelihood of Individual Participating by Structural Context and Individual Race and SES*

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Appendix B: Figures

Figure 1: *Sports Availability by School Racial Composition*

![Sports Available](image)
Figure 2: Sports Availability by School Class Composition