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Examining the provision of interscholastic sports in public high schools among girls in the United States

ABSTRACT

BACKGROUND: In order to better understand some of the barriers to athletic opportunities for girls, we examined school-level characteristics to assess how they are associated with both the provision and participation in athletic opportunities for girls across U.S. public high schools.

METHODS: Cross-sectional data for this study comes from the bi-annual Civil Rights Data Collection which collects school-level information for all U.S. public schools between the 2009-10 through 2017-18 school years.

RESULTS: Several important school-level characteristics were found to limit the provision of athletic opportunities, participation rates and athletic participation gender equity ratios for girls and included the percent of the student body who were eligible for free lunch and who were racial minorities. Moreover, the analysis found that greater provision of athletic opportunities for boys was associated with lower athletic participation gender equity ratios across U.S. public high schools (i.e., lower participation for girls when compared to boys).

CONCLUSIONS: This study provides evidence that schools with fewer resources and a higher proportion of disadvantaged students tend to have the fewest opportunities to participate in school based athletics, particularly among girls. Moreover, girls' participation rates in athletics still lag behind boys despite having similar numbers of sports and sport teams.

KEY WORDS: Sport, Participation, Equity, Schools

Participation in athletics (i.e., organized sport) among adolescents has been found in many studies to be beneficial for both adolescents' academic achievement and health.[1-11] Research has also shown the long-term benefits of participation in athletics leads to better mental and physical health in adulthood.[12-14] Although some nationally representative studies have found that participation in certain types of sport are associated with health compromising behaviors or diminished academic outcomes,[15-17] the overwhelming majority of research has found that participation in athletics is a positive asset in the lives of youth.[3-4,10-11,18]

A variety of studies suggest a link between athletic participation and positive types of health related outcomes among adolescent athletes.[7-9,19-26] The contributions of athletic participation to adolescent physical activity and other positive types of health related outcomes are both direct and indirect. Athletic participation itself constitutes a type of physical activity, and as such, it contributes to the overall physical activity of adolescents.[27-28] Factors like the length of a season, extent of practice time, and the expectations and demands of coaches directly influence overall physical activity rates. Indirectly, many adolescents construct their lifestyles and identities through and around sport.[11,29] In varying degrees, athletics provides a social environment in which coaches and parents can encourage adolescents to develop physical skills, take initiative to enhance their health and physical well-being, and integrate greater levels of physical activity into a healthy lifestyle.[30]

Encouragingly, the provision of athletic opportunities in secondary schools (i.e., interscholastic sport) has increased substantially over the past 40 years.[31] In fact, during the 2017-2018 school year, 7,980,886 adolescents participated in interscholastic sport at the high school level.[32] In other words, nearly half of all students who were enrolled in public high schools (i.e. total number enrolled = 15,100,000)[33] in the U.S. during the 2017-18 school year participated in some type of athletic opportunity provided by their school. While these numbers are reassuring, more effort needs to be directed on assessing these trends across time in order to determine if these opportunities are being equitably distributed to historically disadvantaged groups. Indeed, prior research that has examined these groups have found evidence that the provision of athletic opportunities is limited for girls, minorities, and adolescents from low socioeconomic (SES) backgrounds.[9,34-35] For instance, research focused on the prior decade found that U.S. high schools provide fewer athletic opportunities for girls, particularly those who attend schools with a large proportion of students from low SES backgrounds.[35] Moreover, this same study found that public schools with a higher proportion of female students, minority students, and students from low SES backgrounds were more likely to have cut entire athletic programs between the 1999-2000 and 2009-10 school years.[35] Schools with fewer resources and a higher proportion of historically disadvantaged students tend to have the fewest opportunities to participate in athletics, and additionally, they are more likely to cut these programs from their overall activities portfolio.[34-35] This is problematic since school based athletics may be the only opportunity for underserved populations to participate and engage in physical activity given the decline in physical education in secondary schools,[36] the limited availability of recreational facilities in low-income communities,[9] the financial constraints imposed by youth athletic programs (e.g., private or community organized sports),[37] and the subordinate nature of female-dominated athletic programs.[38]

Although empirical research has established links between involvement in athletics and positive types of health related outcomes among youth, it is important to highlight that these links are stronger for girls when compared to boys with respect to certain developmental outcomes (e.g., taking AP courses in science).[39-40] Participation in athletics among girls may provide a unique experience that can help provide a set of experiences that enhances positive development during this critical stage of adolescence and lessen risky behavior.[41-42] Problematically, girls participation rates in athletics are typically lower than boys[43] and signals that a large segment of girls may not have access to this important resource. While it is hard to determine why this gap exists, it is important to detect potential environmental characteristics at the school-level that contribute to this gap. In particular, the Social Ecological Model provides a useful theoretical framework as it relates to epidemiology, public health, and disease risk.[44-45] One of the major domains that has a direct impact on individual-level behavior or opportunity within this framework are environmental characteristics at the community/institutional level. Certain community-level characteristics that relate to economic, racial and population density can have a direct impact on the resources (or space) that schools can devote to athletic opportunities.[34-35] Within this theoretical framework, it would be expected that athletic opportunities for girls would vary across these environmental characteristics (i.e., economic, racial and population density/geographic location) at the school-level. However, the extent to which these school-level characteristics are associated with athletic opportunities for girls has not been rigorously assessed in order to understand if these environmental factors are related to unequal access to athletic opportunities when compared to their opposite sex peers (i.e., boys).

Accordingly, the purpose of this study has three specific objectives. First, using school-level data from the Office of Civil Rights Data Collection (CRDC), we will examine the provision of athletic opportunities for girls (athletic program, sports and teams), school-level athletic participation rates for girls and the school-level athletic participation gender equity ratio (i.e., girls athletic participation rate divided by boys athletic participation rate) between the 2009-10 through 2017-18 school years; second, we will use the school-level data from the CRDC and the Common Core of Data (CCD) to assess how several environmental school-level characteristics are associated with the provision, participation and gender equity of athletics for girls at the school-level; third, we will assess how the provision of athletic opportunities for both girls and boys are associated with school-level athletic participation rates for girls and the school-level athletic participation gender equity ratio.

METHODS

Participants

The data for this study come from two major publically available sources that collected school-level information for the 2009-10, 2011-12, 2013-14, 2015-16, and 2017-18 school years. The first source of data is the CRDC. [46] The CRDC is a cross-sectional bi-annual mandatory survey given to all public schools (note that the 2009-10 data collection was based on a sample of 72,000 public schools) and has collected information on nearly 100,000 public schools in the U.S. with the purpose to determine whether educational opportunities are being provided in an equitable manner across elementary and secondary schools (the 2017-18 data file is the most current file provided by the CRDC). The second source of data is the CCD, a nationwide survey collected annually by the National Center for Education Statistics.[47] The CCD gathers basic school-level information on all public elementary and secondary schools in the U.S. The two major data sources were merged for the purposes of this study.

Given that only public high schools are instructed to answer questions on interscholastic sports (per the CRDC questionnaire), the results reported here pertain to public high schools that offered grades 9 through 12 (with the purpose to capture traditional high schools). After restricting the data to these parameters, the analytic sample for this study consisted of 9,769 public high schools during the 2009-10 school year, 14,111 schools during the 2011-12 school year, 13,090 schools during the 2013-14 school year, 14,122 schools during the 2015-16 school year, and 14,244 schools during the 2017-18 school year. A total of 16,911 unique public high schools were captured in the analytic sample (this represents 68.9% of public schools in the U.S. that offer grade 12).

Instrumentation

Dependent Variables - Athletic Opportunities for Girls, School-level Athletic Participation Rates for Girls and the School-Level Athletic Participation Gender Equity Ratio: The key dependent measures of interest for this analysis were captured in the CRDC data. The CRDC included information on whether schools offered “interscholastic athletics”, the number of different “athletic sports” (e.g, football, baseball), the number of different "athletic teams" (e.g., J.V. football, varsity football), and "participants" as reported by school administrators (separately for girls and boys). Accordingly, the analysis included five specific dependent measures of athletic opportunities at the school-level: (1) the school indicated not offering athletics (i.e., entire athletic programs), (2) the total number of athletic sports schools provided to girls, (3) the total number of athletic teams schools provide to girls, (4) schools' athletic participation rate for girls (i.e., a continuous measure that takes the total number of girls who participate in single-sex athletic sports divided by the total number of girls within each school), and (5) schools athletic participation gender equity ratio (i.e., a continuous measure that takes the school's girls sport participation rate divided by the school's boys sport participation rate; rates of 1 indicate equal participation rates for boys and girls, rates below 1 indicate lower participation rates for girls compared to boys).

Independent Variables - School-Level Characteristics: Several measures were used to assess differences based on key school-level characteristics that assessed economic, racial, population density/geographic location, and other important school characteristics. The CCD provides measures of several school-level characteristics of high schools that were used for the current study.[40,48] These school-level characteristics included racial composition (percent non-white), federal lunch enrollment as a proxy for school-level poverty (percent free lunch eligible),[49] sex composition (percent female), type of community (city, suburb, town, rural) where the school is located, number of students, whether the school was identified as a charter or magnet school, geographic region (East, Midwest, South and West), and the year the school-level data was collected. Please refer to Table 1 for more descriptive information on these measures.

Procedure

The Office for Civil Rights (OCR) conducts this survey with all U.S. public schools. It is estimated to take 14.1 hours to complete for each school. The CRDC is a mandatory data collection, authorized under the statutes and regulations implementing Title VI of the Civil Rights Act of 1964

Data Analysis

The analysis is divided into three specific sections. First, descriptive statistics for each year were provided to assess the provision of athletic opportunities, school-level athletic participation rates and the school-level athletic participation gender equity ratio for girls and boys. Second, we fitted both logistic and linear regression models using the generalized estimating equations (GEE) methodology with an exchangeable correlation structure to assess the association between the school-level characteristics and school-level athletic opportunities, participation rates and gender equity ratio for girls.[50] It should be noted that GEE was the optimal approach in order to retain the full population of public high schools and account for schools that participated multiple years. Third, using the same school-level characteristics as covariates in the GEE models, we then assessed how athletic opportunities (i.e., athletic sports and teams) provided to girls and boys (e.g., number of sports) were associated with girls sport participation rate and gender equity ratio to determine if adding athletic sports or athletic teams for either girls or boys increased/decreased sport participation rates for girls or the athletic participation gender equity ratio.

RESULTS

Provision of Athletic Opportunities, Participation Rates, And The Athletic Participation Gender Equity Ratio Between The 2009-10 Through 2017-18 School Years

Table 2 shows roughly 22% of schools indicated not offering any athletic program. The percentage of schools not offering athletic programs between the 2009-10 (22.0%) through 2017-18 (19.9%) significantly declined during this nine year period (linear trend: AOR=.976, $p<.001$). When assessing the sample of schools that provided athletic programs, we see that the average number of athletic sports offered to both girls and boys is roughly 7 to 8 sports; the average number of athletic teams offered to both boys and girls is roughly 12 to 13 teams. It should be noted that small declines across the study period were found in the number of athletic sports (linear trend: $b= -.051$, $p<.001$) and athletic teams offered to boys (linear trend: $b= -.259$, $p<.001$), however, a small increase in the number of athletic sports offered to girls was found during this eight year period (linear trend: b= .106, p<.001). The average athletic participation rate for girls was between 40.0% and 46.1%, while the average athletic participation rate for boys was between 50.9% and 57.8%. Overall, athletic participation rates for girls slightly increased between the 2009-10 through 2017-18 school years (linear trend: b= .002, p<.001), while the average athletic participation rate for boys slightly decreased between the 2009-10 through 2017-18 school years (linear trend: b= -.010, p<.001). Finally, the athletic participation gender equity ratio was between .759 and .871, indicating that girls athletic participation rates were roughly 24% to 13% lower than boys athletic participation rates across schools; the athletic participation gender equity ratio did increase between 2009-10 and 2017-18 school years (linear trend: b= .025, p<.001).

Assessing the Association between School-Level Characteristics And The Provision, Participation And Gender Equity Ratio Of Athletics For Girls At The School-Level

Table 3 shows the school-level characteristics associated with whether schools indicated not offering any athletic programs. The results show that schools with a higher percent of female students, schools that have a higher percent of students who are non-white, schools with more students who are free lunch eligible, schools located in cities, smaller schools (i.e., between 0 to 205 students) and schools that were considered charter/magnet have higher odds of not offering any athletic programs when compared to their respective reference groups; for instance, the odds of schools where the student body is predominately non-white (75% to 100% of the student body) were roughly 1.3 times higher (AOR = 1.34, 95% CI = 1.20,1.50) to not offer any athletic programs when compared to schools where the student body is predominately White. Schools in the Midwest, South, and West had higher odds of not offering any athletic programs when compared to schools in the East. Moreover, after adjusting for these school-level characteristics, the odds of schools not offering any athletic programs was slightly lower in more recent years.

Second, examining models 1 and 2 in Table 4 shows that the number of athletic sports and teams schools offered for girls were significantly lower for schools with a high percent of students who were non-white, schools with a high percent of students who were eligible for free lunch, schools located in towns or rural areas, smaller schools (i.e., between 0 to 205 students) and schools that were considered charter/magnet; for instance, schools where 75% to 100% of students were eligible for free lunch typically offered 1 less athletic sport for girls ($b = -1.37$, $p<.001$) and 3 less athletic teams for girls ($b = -2.93$, $p<.001$) when compared to schools where 0% to 24% of students were eligible for free lunch. Schools in the Midwest, South, and West offered fewer athletic sports and teams for girls when compared to schools in the East (except the Midwest with respect to athletic teams). It should also be noted that, after adjusting for these school-level characteristics, the number of athletic sports and teams offered to girls slightly increased during this time period.

Third, model 3 in Table 4 also shows that athletic participation rates for girls were significantly lower for schools with a high percent of students who were female, schools with a high percent of students who were non-white, schools with a high percent of students who were eligible for free lunch, schools located in cities, larger schools (i.e., more than 206 students) and schools that were considered charter/magnet; for instance, schools where 75% to 100% of students were eligible for free lunch typically had athletic participation rates for girls that were 9.5% lower ($b = -.095$, $p<.001$) when compared to schools where 0% to 24% of students were eligible for free lunch. Schools in the Midwest, South, and West had substantially lower athletic participation rates for girls when compared to schools in the east. The adjusted results indicate that athletic participation rates increased for girls during this time period.

Finally, model 4 in Table 4 shows that the athletic participation gender equity ratios were significantly lower for schools with a high percent of students who were female, schools with a high percent of students who were non-white, schools located in towns, larger schools, and schools that were considered regular schools; for instance, schools where 75% to 100% of students were non-white typically had athletic participation gender equity ratios that were 2.1% lower ($b = -.021$, $p<.01$) when compared to schools where 0% to 24% of students were won-white. Schools in the Midwest and South had substantially lower athletic participation gender equity ratios. Notably, athletic participation gender equity ratios increased for girls during this time period.

Assessing How The Provision Of Athletic Opportunities For Both Girls And Boys Are Associated With School-Level Athletic Participation Rates For Girls And Athletic Participation Gender Equity Ratio

Table 5 shows how different types of athletic opportunities provided to girls and boys (i.e., number of athletic sports and teams) were associated with athletic participation rates and athletic gender equity ratios for girls when controlling for school-level characteristics. Accordingly, the results show statistically significant positive associations between athletic opportunities (for girls and boys) and athletic participation rates for girls. For instance, we see that for every one athletic sport added for girls within schools, there is a corresponding 2.5% increase in the athletic participation rate for girls ($b = .025$, $p<.001$). However, while the number of girls athletic sports ($b = .004$, $p<.05$) and girls athletic teams ($b = .004$***, $p<.001$) are positively associated with schools' athletic participation gender equity ratio, the number of boys athletic sports ($b = -.008$, $p<.001$) and number of boys athletic teams ($b = -.006$***, $p<.001$)is negatively associated with schools athletic participation gender equity ratios – this indicates that as boys get more athletic opportunities, gender equity in athletic participation rates within schools decreases. Accordingly, while the results from this table show evidence that increasing the number of athletic sports or teams within the school context is a substantial predictor of increasing athletic participation rates for girls, gender equity in athletic participation is negatively impacted by athletic opportunities being provided to boys.

DISCUSSION

This study highlights that roughly one out of five public high schools offering grades 9 through 12 do not offer any athletic program. While the results indicate that this trend in schools not offering athletics has been declining over the past several years, the results do indicate that schools that cater to historically disadvantaged groups are more likely to indicate not having opportunities to participate in athletics (i.e., girls and racial minorities). Moreover, this study provides further evidence that schools with lower resources and a higher proportion of racial minority students tend to have the fewest opportunities for girls to participate in athletics. In particular, the results from the analysis show that schools located in cities, schools classified as high-poverty, and schools that largely consist of racial minorities provide fewer athletic sports opportunities for girls, fewer athletic teams for girls, have lower athletic participation rates for girls, and in some cases have lower athletic participation gender equity ratios. Accordingly, the results of that analyses show that these environmental characteristics (i.e., i.e., economic, racial and population density/geographic location) are limiting access to participate in athletics and need to be critically scrutinized by federal organizations in order to help improve access to these extracurricular resources within schools.

The results from the analyses also suggest that one clear way to increase athletic participation rates for girls would be to add more athletic opportunities for girls. While adding a new athletic sport (e.g., Volleyball) would require considerable resources from the school, the results also indicated that adding an additional athletic team (e.g., an additional Junior Varsity team to a sport already offered at the school) would have a similar impact on girl's athletic participation rates. Adding additional athletic teams to sports already provided by the school could increase athletic participation among girls without having to invest the amount of resources to add a new athletic sport to the school's athletic portfolio.

Finally, the results of this study also suggest that the provision of single-sex athletic sports and teams for girls and boys has become more equitable in recent school years. For instance, during the 2009-10 school year, schools provided boys roughly 1 additional athletic team when compared to girls (13.9 versus 15.2). However, during the 2017-18 school year, schools provided boys and girls a similar number of athletic teams (12.6 versus 12.8). Despite greater equity in these athletic opportunities and the continual narrowing of the gender gap in athletic participation rates, the gap still persists. Clearly, the analysis provided evidence that adding more athletic sports and teams for girls was associated with increases in the athletic participation gender equity ratio (i.e., narrows the gender gap). Problematically, the analysis also showed that adding more athletic sports and teams for boys was associated with decreases in the athletic participation gender equity ratio (i.e., widens the gender gap). While it is troublesome to suggest that girls should receive more athletic sports than boys, potential solutions could be to add more athletic teams to sports that already exist for girls within schools. Namely, redistributing the number of existing athletic opportunities that may be unevenly distributed within schools could promote greater participation among girls (e.g., there may be more opportunities for boys to play football than opportunities to play volleyball for girls).

Limitations

Despite some of the important contributions of this research, there are several limitations that should be noted. First, the current sample only includes public high schools that offer grades 9 through 12 and does not capture the wide range of schools in the U.S. (e.g., Private schools). Second, the measures for athletic sports and teams only captures single-sex sports and does not capture athletic opportunities that are co-ed. Finally, athletic participation rates in this study may be inflated due to double or triple counting participants across sports due to the question asking school administrators to count the total number of participants across each sport (e.g., a single student could be counted three times if they participate in three separate sports).

Conclusion

The results reported here have implications for parents and educators, as well as coaches and athletic administrators who work in athletics. Most notably, many of these resources that can help improve the lives of girls are still lacking within underserved communities in the U.S. Greater effort is needed to pull more resources into schools that cater to underserved populations in order to expand their athletic sporting curriculum so that regardless of gender or socioeconomic class, students will have access to and can benefit from athletic participation.

IMPLICATIONS FOR SCHOOL HEALTH

This study has specific implications for athletic administrators who work in athletics. Namely, athletic directors or key stakeholders as it relates to school-based athletics need to develop new and innovative strategies to provide greater opportunities for girls to participate given the health, social and academic benefits that are associated with athletic participation.

- Schools administrators and athletic director(s) need to consistently evaluate if athletic sport opportunities are being equitably provided to girls and boys. This would involve a detailed audit of the number of opportunities (i.e., available slots) that each athletic sport provides girls and boys.
- Reallocate athletic sport opportunities to girls that may be taken away from other sports with a high capacity of participation opportunities/slots (e.g., football).
- A greater collaboration across schools to share resources/facilities between high and low resource schools; this may help facilitate greater involvement in athletics among girls who attend schools in lower income communities.

Human Subjects Approval Statement

This study was deemed exempt by the University of Michigan Institutional Review Board based on the CRDC being publicly available secondary data.

Conflicts of Interest

Dr. Veliz is a research consultant at the Women's Sport Foundation.

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Table 1: School-Level Characteristics among Public High Schools.

	2009-10		2011-12		2013-14		2015-16		2017-2018	
School-Level Characteristics	n = 9769[1]		n = 14111[1]		n = 13090[1]		n = 14122[1]		n = 14244[1]	
	%	SE	%	SE	%	SE	%	SE	%	SE
Percent Female										
0% to 44%	13.1%	.003	14.5%	.003	15.3%	.003	16.1%	.003	13.1%	.003
45% to 54%	81.5%	.004	78.9%	.003	78.5%	.004	77.0%	.004	79.6%	.003
55% to 100%	5.4%	.002	6.6%	.002	6.2%	.002	6.9%	.002	6.6%	.002
Percent Non-White										
0% to 24%	39.6%	.005	42.9%	.004	38.4%	.004	38.6%	.004	38.6%	.004
25% to 49%	21.4%	.004	21.0%	.003	22.4%	.004	21.8%	.003	22.1%	.003
50% to 74%	15.5%	.004	14.5%	.003	15.6%	.003	15.2%	.003	15.5%	.003
75% to 100%	23.5%	.004	21.6%	.003	23.6%	.004	24.4%	.004	23.8%	.004
Percent Free Lunch Eligible										
0% to 24%	37.9%	.005	36.2%	.004	28.4%	.004	28.0%	.004	28.6%	.004
25% to 49%	36.6%	.005	37.5%	.004	38.7%	.004	37.4%	.004	38.7%	.004
50% to 74%	19.2%	.004	18.7%	.003	22.9%	.004	22.2%	.004	21.1%	.004
75% to 100%	6.3%	.002	7.6%	.002	10.0%	.003	12.3%	.003	11.7%	.003
Type of Community										
City	27.2%	.005	21.5%	.003	22.9%	.004	23.1%	.004	22.1%	.004
Suburb	29.3%	.005	24.9%	.004	29.7%	.004	29.2%	.004	28.8%	.004
Town	14.5%	.004	15.7%	.003	16.9%	.003	16.7%	.003	16.7%	.003
Rural	29.0%	.005	37.8%	.004	30.6%	.004	31.0%	.004	32.4%	.004
Number of Students[2]										
0 to 205	17.0%	.004	23.1%	.004	21.7%	.004	23.2%	.004	19.5%	.004
206 to 430	12.1%	.003	17.1%	.003	16.7%	.003	17.3%	.003	18.2%	.003
431 to 900	17.3%	.004	21.5%	.003	21.8%	.004	21.4%	.003	22.8%	.003
901 or more	53.6%	.005	38.3%	.004	39.9%	.004	38.2%	.004	39.5%	.004
Charter/Magnet School										
Regular public high school	93.2%	.003	89.7%	.003	89.8%	.003	93.3%	.002	87.6%	.002
Charter/Magnet School	6.8%	.003	10.3%	.003	10.2%	.003	6.7%	.002	12.4%	.002
Geographic Region										
East	13.4%	.003	14.1%	.003	13.7%	.003	14.5%	.003	14.3%	.003
Midwest	23.0%	.004	28.2%	.004	23.1%	.004	25.7%	.004	27.8%	.004
South	38.0%	.005	32.9%	.004	36.7%	.004	35.1%	.004	35.9%	.004
West	25.6%	.004	24.7%	.004	26.5%	.004	24.7%	.004	22.0%	.004

% = percent; SE = Standard Error; n = sample size of schools for the specified year.

[1]It should be noted that the majority of the schools used for this analysis participated across several of the school years (65,336 observations within 16,911 public high schools); 41.8% of schools participated in all five school years, 27.8% of the schools participated in four of the school years, 12.8% participated in three of the school years, 10.2% participated in two of the school years, and 7.4% participated in on one of the school years.

[2]We use enrollment cutoffs that are the classifications used by the Michigan High School Athletic Association to determine which division schools will be placed (class A is the largest and class D is the smallest) (For more information: https://www.mhsaa.com/).

Table 2: Athletic Opportunities, Participation Rates and Athletic Gender Equity Ratio for Girls and Boys Across Public High Schools.[1]

All Schools (n = 16911; unique schools)	2009-10	2011-12	2013-14	2015-16	2017-18	Linear Trend[1]
	n = 9769	n = 14111	n = 13090	n = 14122	n = 14244	n = 16,911 (unique schools)
	% (SE)	% (SE)	% (SE)	% (SE)	% (SE)	AOR (95% CI)
School Indicated not Offering any Athletic Programs	22.0% (.004)	21.2% (.003)	22.6% (.003)	23.5% (.004)	19.9% (.004)	.976**(.959,.994)
Schools with Athletic Programs (n = 13108; unique schools)	2009-10	2011-12	2013-14	2015-16	2017-18	Linear Trend[1]
	n = 7615	n = 11105	n = 10051	n = 10804	n = 11405	n = 12,988 (unique schools)
	Mean (SE)	Mean (SE)	Mean (SE)	Mean (SE)	Mean (SE)	b (SE)
Athletic Opportunities for Girls[2]						
Number of Athletic Sports (girls)	7.82 (.043)	7.50 (.036)	7.39 (.040)	7.48 (.038)	7.64 (.038)	.106***(.009)
Number of Athletic Teams (girls)	13.9 (.092)	12.7 (.070)	12.3 (.080)	12.4 (.076)	12.6 (.074)	.014 (.016)
Athletic Participation Rate						
Participation Rate (girls)	.400 (.002)	.461 (.002)	.420 (.002)	.435 (.002)	.436 (.002)	.002***(.001)
Athletic Opportunities for Boys[2]						
Number of Athletic Sports (boys)	8.28 (.043)	7.84 (.035)	7.45 (.039)	7.49 (.037)	7.51 (.036)	-.051***(.008)
Number of Athletic Teams (boys)	15.2 (.092)	13.8 (.076)	12.7 (.082)	12.7 (.077)	12.8 (.076)	-.259***(.016)
Athletic Participation Rate						
Participation Rate (boys)	.524 (.003)	.578 (.002)	.509 (.002)	.520 (.002)	.510 (.002)	-.010***(.010)
Athletic Participation Gender Equity Ratio[2]						
Girls participation rate/Boys participation rate	.759 (.003)	.803 (.003)	.837 (.004)	.848 (.003)	.871 (.003)	.025***(.001)

% = percent; SE = Standard Error; n = sample size of schools for the specified year; AOR = adjusted odds ratio (logistic regression); b = unstandardized regression coefficient (for continuous outcomes); SE = standard error; $p<.01$**; $p<.001$***.

[1]Linear trends were assessed using Generalized Estimating Equations with and exchangeable correlation structure when controlling for percent female, percent non-white, percent free lunch eligible, community type, school size, whether the school was designated a charter or magnet, and geographic region (see Table 1 for more details on these covariates).

[2]It should be noted that extreme cases were removed if schools indicated offering 51 or more athletic sports (for girls or boys), 101 or more athletic teams (for girls or boys), and had a athletic participation rate that exceeded 2.01 (for girls or boys). These extreme cases represented roughly 0.2% (roughly 100 observations).

Table 3: Assessing the Association between School-Level Characteristics and Whether Schools Did Not Offer Any Athletic Programs.

School-Level Characteristics	School Does Not Offer Any Athletic Programs n = 16271[1] %	AOR 95%CI
% Female		
0% to 44%	54.7%	
45% to 54%	11.5%	.572*** (.535,.610)
55% to 100%	63.6%	1.36*** (1.23,1.50)
% Non-White		
0% to 24%	14.6%	
25% to 49%	19.7%	1.31*** (1.20,1.43)
50% to 74%	24.0%	1.47*** (1.32,1.64)
75% to 100%	31.9%	1.34*** (1.20,1.50)
% Free Lunch Eligible		
0% to 24%	13.4%	
25% to 49%	17.4%	1.09* (1.01,1.18
50% to 74%	29.8%	1.28*** (1.17,1.41)
75% to 100%	34.0%	1.04 (.933,1.17)
Type of Community		
City	31.7%	
Suburb	19.1%	.918 (.832,1.01)
Town	22.6%	.426*** (.380,.477)
Rural	16.9%	.158*** (.141,.176)
Number of Students		
0 to 205	61.5%	
206 to 430	29.0%	.256*** (.236,.278)
431 to 900	12.0%	.076*** (.069,.083)
901 or more	3.0%	.011*** (.009,.012)
Charter/Magnet School		
Regular public high school	19.1%	
Charter/Magnet School	48.6%	1.91*** (1.74,2.09)
Geographic Region		
East	11.5%	
Midwest	20.6%	1.55*** (1.36,1.76)
South	19.4%	1.96*** (1.73,2.23)
West	32.5%	2.33*** (2.05,2.65)
School Year		
2009-10	22.0%	
2011-12	21.2%	.569*** (.528,.614)
2013-14	22.7%	.751*** (.690,.817)
2015-16	23.5%	.746*** (.687,.811)
2017-18	19.9%	.715*** (.657,.778)

*p<.05, **p<.01, ***p<.001; % = Percent; AOR = adjusted odds ratio; 95% CI = 95% confidence interval

Notes: [1]Sample sizes vary due to missing values on either the outcome or covariates. It should be noted that the analyses that assessed if schools did not offer athletic programs used the full sample of schools (i.e., n = 16,911); while the analyses assessing number of athletic sports offered to girls, number of athletic teams offered to girls, girls athletic participation rates, and athletic participation gender equity ratios used only the sample of schools that indicated having athletic programs (i.e., n = 13,108). All analyses use listwise deletion with respect to missing information on both athletic opportunities and school-level characteristics.

Table 4: Assessing the Association between School-Level Characteristics and Athletic Opportunities, Participation Rates and Gender Equity Ratio for Girls.

School-Level Covariates	Number of Athletic Sports (Girls) n = 12964[1] Model 1			Number of Athletic Teams (Girls) n = 12964[1] Model 2			Girls Athletic Participation Rate n = 12964[1] Model 3			Athletic Participation Gender Equity Rato[1]: n = 12935[1] Model 4		
	Mean	b	SE	Mean	b	SE	Mean	b	SE	Mean	b	SE
% Female												
0% to 44%	5.39	Reference		7.90	Reference		0.529	Reference		0.997	Reference	
45% to 54%	7.82	.229***	(.052)	13.3	.613***	(.095)	0.423	-.020***	(.003)	0.814	-.113***	(.006)
55% to 100%	5.41	-.017	(.101)	7.57	-.072	(.185)	0.407	-.083***	(.006)	0.776	-.225***	(.011)
% Non-White												
0% to 24%	7.32	Reference		12.4	Reference		0.543	Reference		0.867	Reference	
25% to 49%	8.07	.069	(.050)	13.9	.347***	(.096)	0.406	-.033***	(.003)	0.800	-.026***	(.005)
50% to 74%	8.03	.150*	(.064)	13.5	.375**	(.124)	0.345	-.051***	(.004)	0.794	-.023***	(.006)
75% to 100%	7.11	-.369***	(.073)	11.5	-.657***	(.142)	0.286	-.091***	(.004)	0.801	-.021**	(.007)
% Free Lunch Eligible												
0% to 24%	8.69	Reference		15.8	Reference		0.524	Reference		0.846	Reference	
25% to 49%	7.24	-.698***	(.042)	11.8	-1.67***	(.079)	0.428	-.056***	(.004)	0.829	.002	(.004)
50% to 74%	6.78	-.985***	(.060)	10.6	-2.54***	(.113)	0.331	-.086***	(.005)	0.806	-.017***	(.006)
75% to 100%	5.78	-1.37***	(.081)	8.63	-2.93***	(.152)	0.316	-.095***	(.004)	0.793	-.051***	(.009)
Type of Community												
City	8.23	Reference		13.8	Reference		0.296	Reference		0.799	Reference	
Suburb	9.31	.145*	(.059)	16.4	.658***	(.118)	0.403	.028***	(.004)	0.811	-.015	(.006)
Town	6.85	-.548***	(.071)	11.4	-.669***	(.140)	0.466	.056***	(.004)	0.811	-.023**	(.007)
Rural	5.98	-.623***	(.065)	9.5	-.787***	(.128)	0.520	.059***	(.004)	0.867	.003	(.006)
Number of Students												
0 to 205	3.55	Reference		4.87	Reference		0.659	Reference		0.988	Reference	
206 to 430	5.20	1.33***	(.072)	7.91	2.56***	(.139)	0.543	-.110***	(.005)	0.877	-.093***	(.008)
431 to 900	6.95	2.87***	(.073)	10.8	5.48***	(.143)	0.456	-.185***	(.005)	0.821	-.133***	(.008)
901 or more	9.31	4.92***	(.074)	16.5	10.2***	(.145)	0.342	-.254***	(.005)	0.786	-.157***	(.008)
Charter/Magnet School												
Regular public high school	7.57	Reference		12.8	Reference		0.442	Reference		0.828	Reference	
Charter/Magnet School	7.31	-.254***	(.067)	10.7	-1.00***	(.124)	0.280	-.044***	(.004)	0.821	.023**	(.007)
Geographic Region												
East	9.34	Reference		15.4	Reference		0.551	Reference		0.892	Reference	
Midwest	7.19	-.976***	(.066)	13.0	-.080	(.135)	0.523	-.078***	(.004)	0.853	-.074***	(.006)
South	7.13	-1.56***	(.066)	10.9	-2.96***	(.135)	0.333	-.173***	(.004)	0.750	-.139***	(.006)
West	7.38	-1.46***	(.072)	13.3	-1.15***	(.147)	0.401	-.108***	(.005)	0.884	-.012	(.007)
School Year												
2009-10	7.81	Reference		13.9	Reference		0.400	Reference		0.759	Reference	
2011-12	7.49	.429***	(.040)	12.7	.382***	(.071)	0.459	.023***	(.003)	0.803	.023	(.023)
2013-14	7.39	.216***	(.040)	12.2	-.305***	(.071)	0.420	.006*	(.003)	0.837	.069***	(.005)
2015-16	7.48	.438***	(.041)	12.3	.039	(.072)	0.434	.014***	(.003)	0.848	.077***	(.005)
2017-18	7.64	.597***	(.040)	12.6	.313***	(.071)	0.435	.018***	(.003)	0.871	.101***	(.005)

*p<.05, **p<.01, ***p<.001; SE = Standard Error; b = unstandardized beta coefficient. [1]Sample sizes vary due to missing values on either the outcome or covariates. All analyses use listwise deletion with respect to missing information on both athletic opportunities and school-level characteristics.

Table 5: Assessing the Association between Athletic Opportunities and Athletic Participation Rates and Participation Gender Equity Ratio for Girls.

School-Level Opportunities	**Girls Athletic Participation Rate[1]**			**Athletic Participation Gender Equity Ratio[1]**		
Number of Athletic Sports (Girls)	Model 1:			Model 2:		
	b	(SE)	β	b	(SE)	β
	.025***	(.001)	0.404	.004*	(.001)	0.015
Number of Athletic Teams (Girls)	Model 3:			Model 4:		
	b	(SE)	β	b	(SE)	β
	.014***	(.0001)	0.443	.004***	(.0003)	0.089
	Girls Athletic Participation Rate[1]			**Athletic Participation Gender Equity Ratio[1]**		
Number of Athletic Sports (Boys)	Model 5:			Model 6:		
	b	(SE)	β	b	(SE)	β
	.024***	(.001)	0.380	-.008***	(.001)	-0.028
Number of Athletic Teams (Boys)	Model 7:			Model 8:		
	b	(SE)	β	b	(SE)	β
	.012***	(.0001)	0.395	-.006***	(.001)	-0.044

*p<.05, **p<.01, ***p<.001; SE = Standard Error; b = unstandardized beta coefficient; β = Standardized beta coefficient; -- = not applicable due to the outcome and covariate being identical or a redundant analysis.
Notes: [1]All analysis (eight separate models) control for percent female, percent Non-White, percent eligible for free lunch, type of community, number of students, charter/magnet school status, special educational school status, geographic region, and school year. Standardized beta coefficients were estimated with Ordinary Least Squares regression (GEE does not produce standardized estimates).